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The IRON AGE

DECEMBER 9, 1948

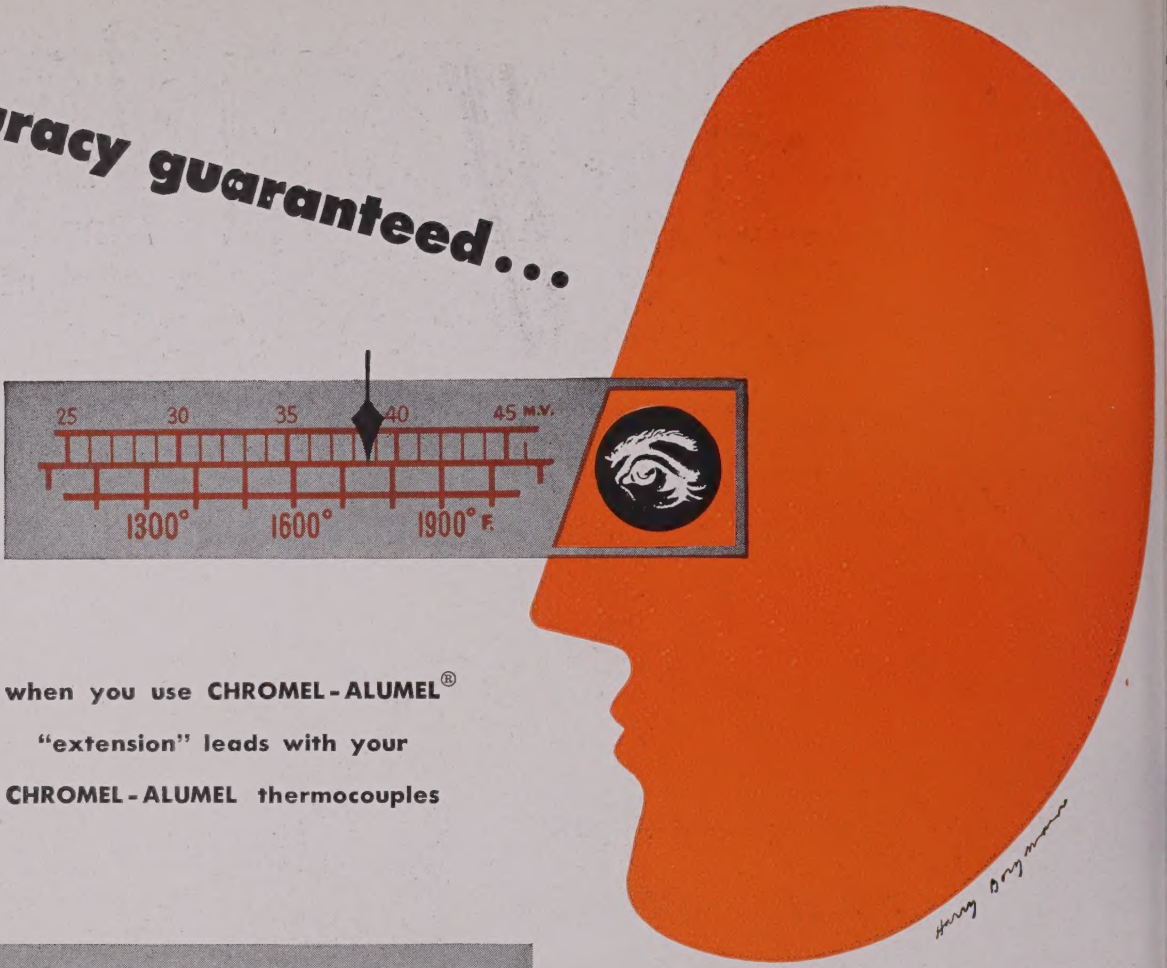
Lavino Ferro Manganese

MANGANESE
AND CHROME ORES
FERRO MANGANESE
REFRACTORIES

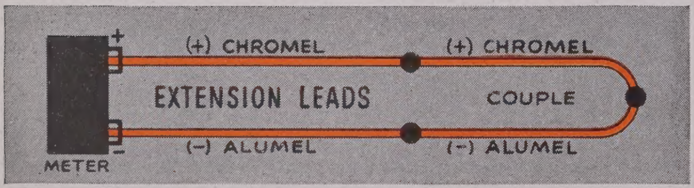
E. J. LAVINO AND COMPANY
1528 WALNUT STREET • PHILADELPHIA 2, PA.
Pittsburgh Office 22, 1819 Oliver Building

Sales Agents for Ferro Manganese
OGLEBAY NORTON AND COMPANY
CLEVELAND 15, Hanna Building
CHICAGO 4, 208 South La Salle Street

accuracy guaranteed...



when you use CHROMEL-ALUMEL®
"extension" leads with your
CHROMEL-ALUMEL thermocouples



Your pyrometers are probably accurate . . . most of them are today. And, too, most of them are calibrated for dependably accurate CHROMEL-ALUMEL thermocouples. But they can still register *inaccurate* temperature-E.M.F. values if you're using so-called "compensating" lead wires. Here's why . . .

When "compensating" leads are used, wires of different composition are joined together forming thermo-electric junctions just outside the furnace. When these junctions get hot . . . as they very often do . . . or when one gets hotter than the other, the opposing E.M.F.s they generate become more and more unequal . . . and serious plus or minus errors are registered by your meter.

So if you're concerned with accurate temperature measurement, make sure your pyrometers are calibrated for *and equipped with* durable CHROMEL-ALUMEL couples. They carry a positive accuracy guarantee of ±5° between 32° and 660° F., and ±¾% at temperatures above 660° F. And, of course, protect this fine accuracy by using only CHROMEL-ALUMEL *extension* leads. They belong together . . . and together they eliminate all possibility of "cold-end" errors! Our Catalog—58R contains complete technical information . . . want a copy?

Additional References: Bureau of Standards Research Papers . . . R.P. 767—"Standard Tables for Chromel-Alumel Thermocouples". R.P. 768—"Methods of Testing Thermocouples". R.P. 1278—"Stability of Base Metal Thermocouples in Air at 800° to 2200° F."

Chromel®
nickel-chromium wire

HOSKINS MANUFACTURING COMPANY
4445 LAWTON AVE. • DETROIT 8, MICHIGAN

Heating Element Alloys ★ Heat Resistant Alloys ★ Thermocouple Alloys ★ Spark Plug Electrode Wire ☆ Special Alloys of Nickel ★ Electric Heat Treating and Laboratory Furnaces

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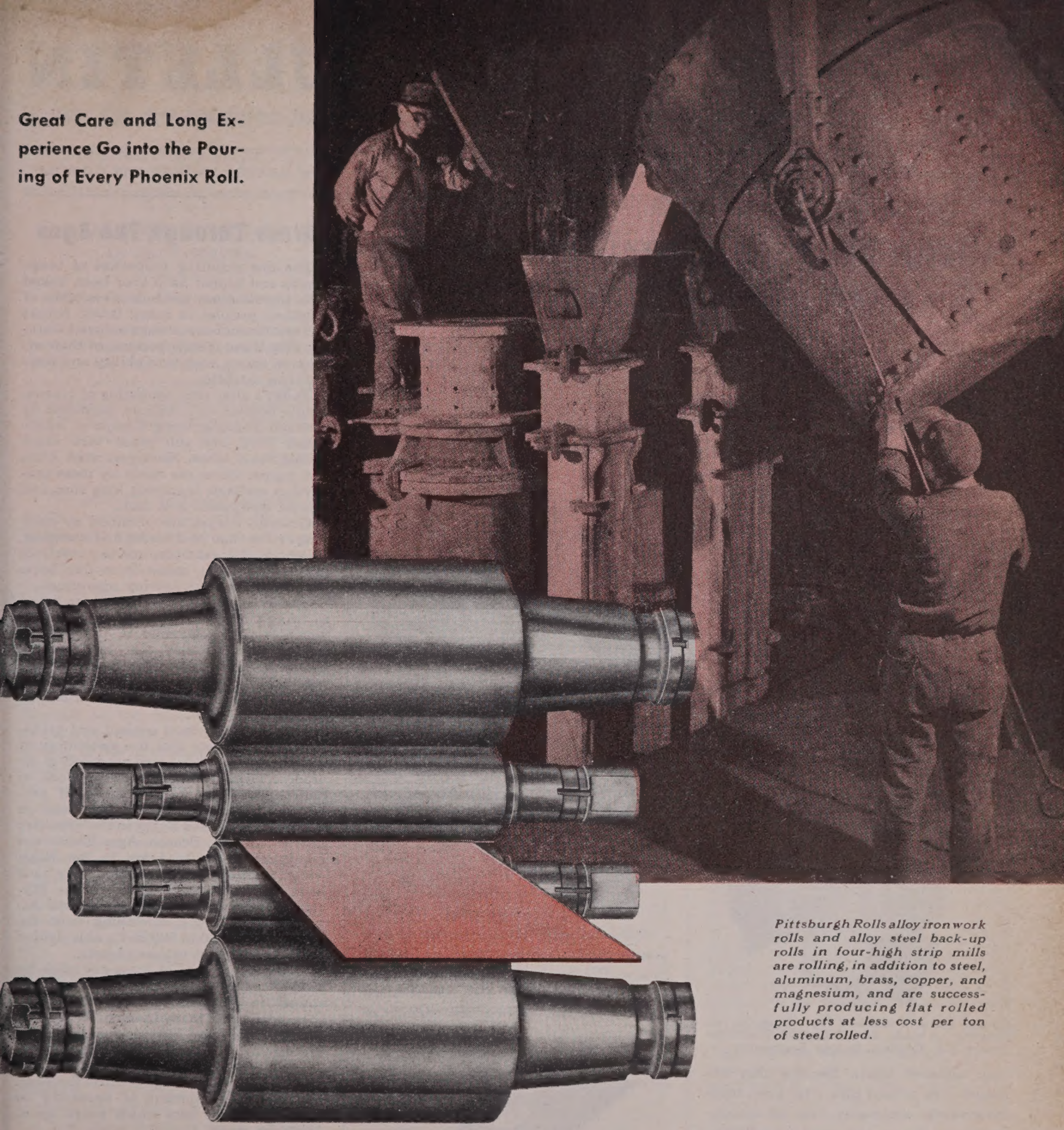
THE IRON AGE, published every Thursday by the *CHILTON CO. (INC.)*, Chestnut and 56th Sts., Philadelphia 39, Pa. Entered as second class matter Nov. 8, 1932, at the Post Office at Philadelphia under act of March 3, 1879. $8 yearly in United States, its territories and Canada; other Western Hemisphere Countries $15; other Foreign Countries $20 per year. Single Copies 35¢. Annual Review Number, $2.00. Vol. 162, No. 24.

Great Care and Long Experience Go into the Pouring of Every Phoenix Roll.



Pittsburgh Rolls alloy iron work rolls and alloy steel back-up rolls in four-high strip mills are rolling, in addition to steel, aluminum, brass, copper, and magnesium, and are successfully producing flat rolled products at less cost per ton of steel rolled.

FOUR...FIVE...SIX THOUSAND FEET PER MINUTE

As speeds go higher in continuous strip mills, roll changes and shut-downs become more costly. The durable qualities, strength, and finish of Phoenix rolls mean real savings.

P.R.W

PITTSBURGH ROLLS

DIVISION OF BLAW-KNOX COMPANY, PITTSBURGH 1, PENNSYLVANIA

COPPER ALLOY BULLETIN

REPORTING NEWS AND TECHNICAL DEVELOPMENTS OF COPPER AND COPPER-BASE ALLOYS

Prepared Each Month by Bridgeport Brass Co. "Bridgeport" BRASS CO. *Headquarters for BRASS, BRONZE and COPPER*

Silicon Bronzes, Aluminum Bronzes

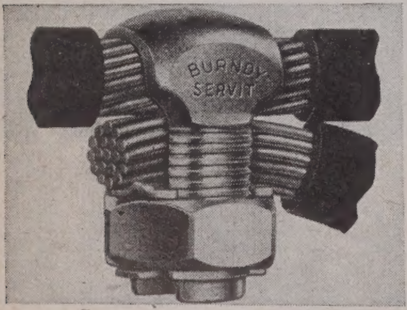
For Severe Engineering Requirements

Engineers are recognizing more and more that shutdowns due to corrosion of small but important parts can be avoided by using non-rusting, high-strength metals.

This explains the trend toward a wider use of Silicon Bronzes and Aluminum Bronzes for pole line hardware, marine hardware, building hardware and other articles that are subjected to moisture and weathering. Pole line hardware — bolts, nuts, wire, cable connectors, etc. — gives metals their most difficult assignment, since it is widely used for carrying high tension power lines and must be absolutely dependable.

Silicon Bronze Connectors Can Be Used Repeatedly

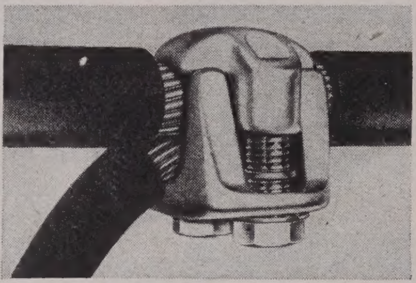
For ease and speed of assembly, and to permit repeated use, connectors are generally designed on the principle of clamping conductors with threaded devices rather than soldered joints. Because they are meant to be re-used time after time, these labor-saving connectors must not deteriorate under the severest service conditions.



Burndy Servit, a split-bolt type electric service connector, is made from Bridgeport Aluminum Bronze 715. Courtesy Burndy Engineering Co.

These exacting requirements explain why the Silicon Bronzes and, more recently, the Aluminum Silicon Bronzes, are used for fastening and connecting devices. whether they suspend high voltage lines hundreds of feet above the ground, or tie in the electrical arteries of a building.

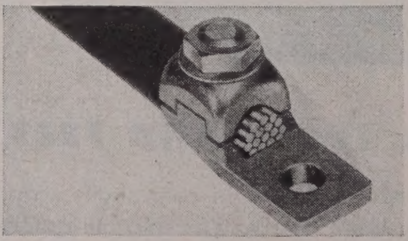
Bridgeport Silicon Bronze 609, for example, is widely used for the manufacture of high strength bolts and nuts. Hard drawn Silicon Bronze wire retains its malleability to a surprising degree. Consequently, it work-hardens rapidly, without developing brittleness. Bolts can be economically made by cold heading and roll threading with no intermediate anneals. The strength of the material is fully developed in the finished bolts, which average about 100,000 psi in tensile strength. This high value is remarkable, inasmuch as this alloy contains about 98% Copper and 2% Silicon. Compare this exceptionally high strength with that of ordinary steel bolts, which average about 70,000 psi in tensile strength when new, i.e., before they begin to rust. Silicon Bronze resembles Copper in corrosion resistance, developing a green surface patina which retards further corrosion.



Burndy Oklip Connector, designed for heavy-duty service. Body made from Duronze III* (Silicon Aluminum Bronze); bolts from Bridgeport Silicon Bronze 609. Courtesy Burndy Engineering Co.

Reduce Maintenance and Replacement

There are many other engineering uses besides the applications mentioned, where Silicon Bronzes and Aluminum Bronzes should be specified. In fact, where moisture is present, non-rusting metals or alloys are required for long, uninterrupted service — essential for engineering construction where both high strength and corrosion-resistance are factors. A wider use of these alloys will do much to reduce the cost of corrosion that amounts to many millions of dollars every year in repairs, shutdowns and eventual replacements.



Burndy Qiklug, a lug or terminal for general use. Bridgeport's Silicon Bronze 609 is used for the nut because of its high strength. Courtesy Burndy Engineering Co.

*Reg. U. S. Pat. Off.

Brass Through The Ages

The fine enduring properties of brass, bronze and copper have ever been linked with the religious symbols of worship of countless peoples in many lands. Artists and craftsmen have always enjoyed working with these metals because of their attractive colors, easy workability and their enduring qualities.

Today's altar sets, consisting of crosses, candle holders and chalices, produced by Rostand Manufacturing Company, established 1902, are still made with much skilled hand labor. However, most brass and copper items are made by mass production methods involving long runs and special equipment and tools.

Graceful shapes are obtained by spinning rather than by drawing and stamping. Pedestals, for example, are the result of assembling parts made from flat brass strip by numerous brazing operations.

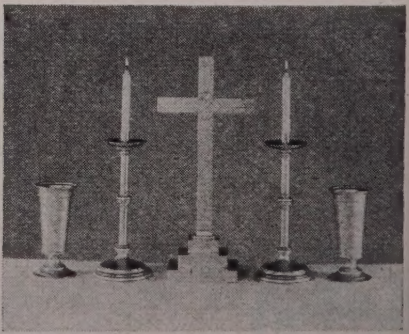
The finished parts are carefully polished to bring out the warm color of the brass, which is then lacquered to preserve its lustre. With articles that are handled often, the finish is retained by using gold plate. More emphasis is placed on the quality of fine workmanship than on low prices.

Studies of the most ancient and primitive ruins indicate that the metallurgy of copper and its alloys was practised in its crudest forms in the earliest periods of man's development. Evidences of prehistoric metallurgy have been found in western Europe and Egypt in the "smelters hoards" of the Bronze Age. There are many references to brass in the Bible which, due to faulty translation, may have been either bronze or copper. The Mycenaean, Phoenician, Babylonian and Assyrian civilizations, stretching over the period from 1500 to 500 B. C., also yielded many copper and bronze objects.

Even as late as 1574 brass was made by mixing calamine, fine coal, alum, salt and copper in granules or small fragments, then heating for many hours to form brass.

Strip brass for buttons was made in Waterbury, Connecticut, early in 1800.

Today the purest of copper and zinc are melted together in huge electric furnaces. Mechanical equipment is necessary to handle the cast bars which weigh up to 2,000 lbs. each.



Altar sets of exquisite design and fine workmanship are made from brass and involve many hand operations. Courtesy Rostand Manufacturing Company, Milford, Connecticut.

COPPER ALLOY BULLETIN (Continued)

DECEMBER, 1948

CAUSES OF CORROSION

This article is one of a series of discussions by C. L. Bulow, Research Chemist of the Bridgeport Brass Company.

GALVANIC CORROSION IN SALT WATER

Satisfactory Galvanic Couples

The extremes in potential differences between various copper-base alloys in sea water and in 3% sodium chloride solutions is small, seldom exceeding 0.2 volts. Consequently copper and various copper alloys can be successfully coupled together in such corrosive media. This explains why they are so widely used in salt water services.

The potential difference between dissimilar metals may be unimportant due to the smallness of the exposed area of the more noble member of the galvanic couple. For example, copper alloy bolts fastened in steel plates immersed in sea water do not necessarily lead to increased corrosion of the steel. In such a galvanic couple, the *initial* potential difference between copper and low carbon steel may range from 0.5 to 0.7 volts. This lack of activity is due to stifling of the cathodic reaction on the relatively small surface of the copper alloy bolt head and nut. The stifling is due primarily to deposition of magnesium and calcium carbonate from the sea water on the cathodic surface (copper alloy). This explains why the widespread use of bronze bolts to fasten steel or cast iron parts in marine services has led to no difficulty from galvanic corrosion.

Zinc coatings on steel, such as are produced by galvanizing, give considerable galvanic protection to the underlying steel. This protection usually continues until practically all of the zinc has corroded.

Where steel or aluminum is coupled to relatively large areas of painted copper so that the copper surface cannot function as a cathode, little or no accelerated corrosion of the steel or aluminum occurs. However, "it is the safest practice to paint both the anodic and cathodic areas with the best alkali-resistant paints available.

(*Continued from column 1*)

Care should be exercised to avoid pinholes, uncoated edges, fraying surfaces and similar foci for galvanic attack".[1]

---

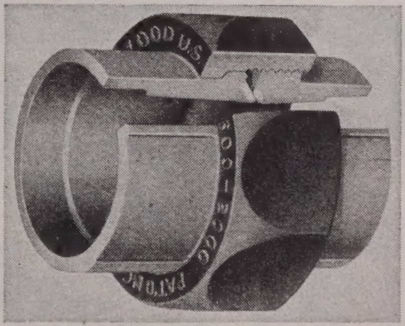
[1] G. W. Segren, G. H. Young and F. L. LaQue, Corrosion (N.A.C.E.) 2,2, 67-77 (1946).

Silicon Bronze 632 Eliminates Corrosion at Seat Joint of Rockwood Sprinkler Unions

The Rockwood Sprinkler Company Union shown below has seats made from Bridgeport's Silicon Bronze 632 for extra strength, toughness and resistance against corrosion. These cold-forged steel unions are meeting all general piping requirements in the shipbuilding, chemical, steel, rubber, paper, textile and allied industries.

Silicon Bronze 632 contains approximately 97% copper and 3% silicon. In applications similar to this union seat joint, the high strength of silicon bronze is advantageous and its joining properties are at least equal to phosphor bronze.

Stronger, tougher and more fatigue resisting than copper, it also offers excellent resistance to season or corrosion cracking and fine cold working qualities for operations such as bending and flaring. It is recommended where specifications call for higher physical properties than can be met with copper.



Seating foils of Silicon Bronze 632 in new modern socket-weld union manufactured by Rockwood Sprinkler Co.

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

Reversing Blade in new screwdriver makes it possible to drive standard and Phillips head screws with same tool simply by a quick reversal of blade. **No. 892**

Wire Straightener is announced that straightens length of heavy wire for pass through feed tube rolls and supplies power to push wire into nut formers and other cold heading equipment. **No. 893**

Metalworking Tool Kit is said to provide handy assortment of tools for shop or on-the-job sheet metal work. Included are radius cutter, heavy-duty straight line cutter, metal shrinker and metal stretcher. **No. 894**

New Type Grinding Wheel consists of inflated rubber wheel that carries abrasive band to provide a resilient tool for finishing flat or curved surfaces and depressions. **No. 895**

A Staging Fixture is reported to speed positioning of threaded work on optical projection comparators, holding it in correct position to check pitch diameter, major and minor diameters, crest, flank angle and lead in any ANF screw between .073" and 1.0" O.D. **No. 896**

New Refractory Material is said to provide thermal barrier simply by applying by brush, trowel or extruding gun to such surfaces as electrical junction boxes, heat-exchanger couplings, steam pipes, hot air ducts, etc. **No. 897**

Machinability Testing Fixture is said to weigh the vertical pressure component of a machining cut made by a standard-sized carbide-tipped bit secured in the holder. A dial gage shows deflection due to load in terms of machinability of material being cut. **No. 898**

A New Gear Gage has been announced that is made with 20-degree pressure angle full length tooth forms and stub tooth forms. It is said that by merely rolling the gage over the teeth of a gear the pitch can be determined without error. **No. 899**

An Improved Blue-Color Layout Fluid has been developed, which is said to be suited for application to brass, copper, stainless steel, cast iron and tin surfaces to provide a background through which layout lines can be scribed. **No. 900**

BRASS, BRONZE, COPPER, DURONZE, NICKEL SILVER, CUPRO NICKEL

Warehouse Service with Slitting Facilities in Principal Cities

STRIP AND SHEET—For drawing, stamping, forming, spinning. Leaded alloys for machining, drilling, tapping. Silicon bronze, phosphor bronze for corrosion resistance. Alloys suitable for springs. Engravers' copper and brass.

WIRE—Cold Heading alloys for screws, bolts, nuts, nails, fastenings, electrical connectors, Phono-Electric trolley and contact wires.

ROD—Alloys for screw machine operation. Duronze III high strength, corrosion-resistant, good for machining and hot forging. Hot forging and cold heading alloys. Welding Rods. Copper-covered ground rod.

TUBING—For miscellaneous fabrication. For condensers and heat exchangers. For water, air, oil and hydraulic lines.

DUPLEX TUBING—For conditions too severe for a single metal or alloy.

PIPE—Brass and copper for plumbing.

FABRICATED GOODS—Plumbing brass goods. Radiator air valves. Aer-a-sol insecticide dispensers. Automobile tire valves.

TECHNICAL SERVICE—Staff of experienced, laboratory-trained men available to help customers with their metal problems.

WAREHOUSE SERVICE—Warehouse and jobbers stocks available for prompt delivery in principal cities.

TECHNICAL LITERATURE—Manuals and handbooks available for most products.

"Bridgeport" BRASS CO.

BRIDGEPORT BRASS

BRIDGEPORT BRASS COMPANY, BRIDGEPORT 2, CONN. • ESTABLISHED 1865

Mills at Bridgeport, Connecticut, and Indianapolis, Indiana • In Canada: Noranda Copper and Brass Limited, Montreal

Cuts grinding time in half

Savings pay for tools in 5 months

THIS manufacturer of materials handling equipment was using universal electric grinders when the Rotor Application Engineer called to find ways of cutting grinding costs. The Rotor Application Engineer recommended replacement with Rotor Air Grinders and demonstrated them with these results:

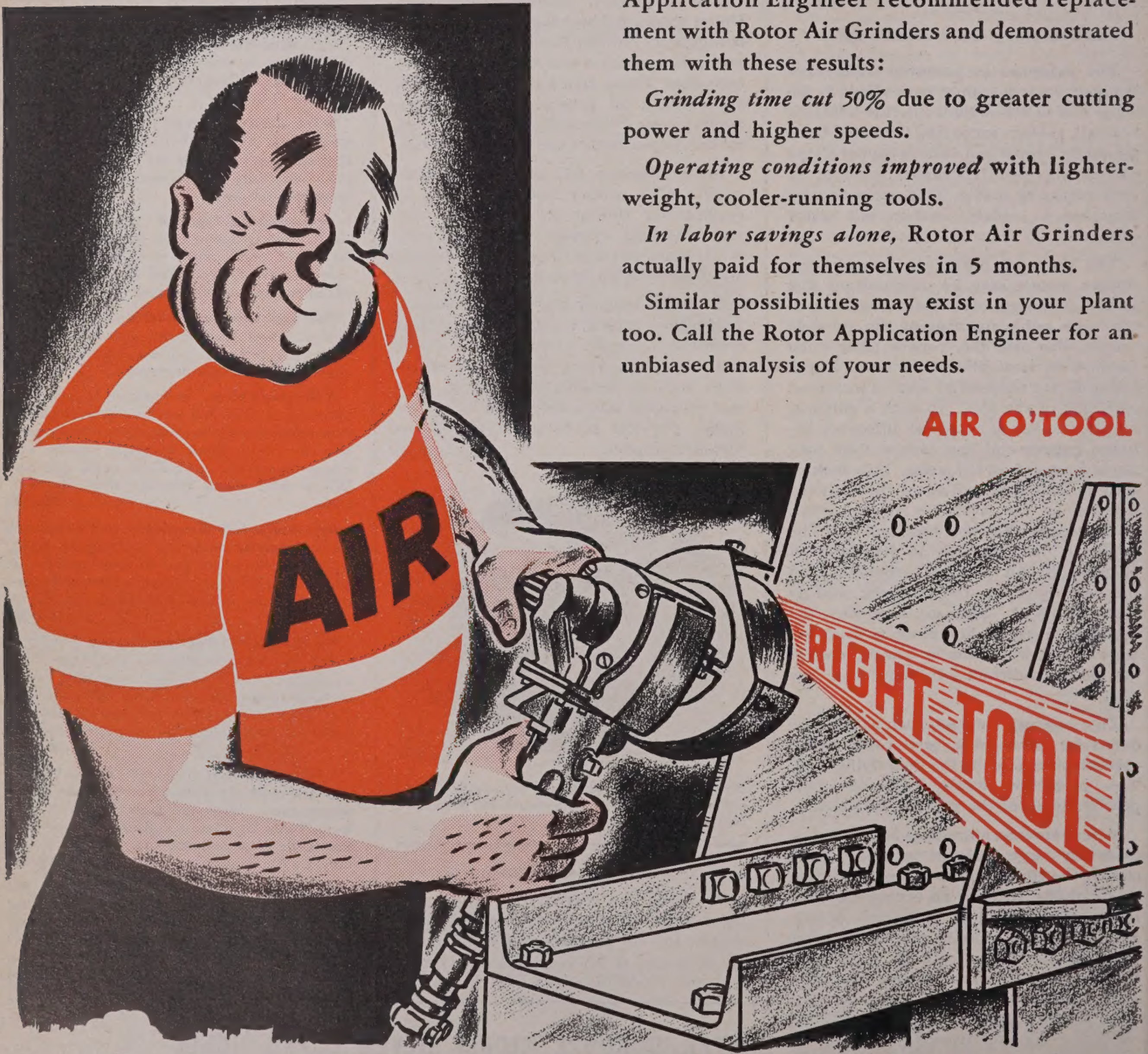
Grinding time cut 50% due to greater cutting power and higher speeds.

Operating conditions improved with lighter-weight, cooler-running tools.

In labor savings alone, Rotor Air Grinders actually paid for themselves in 5 months.

Similar possibilities may exist in your plant too. Call the Rotor Application Engineer for an unbiased analysis of your needs.

AIR O'TOOL



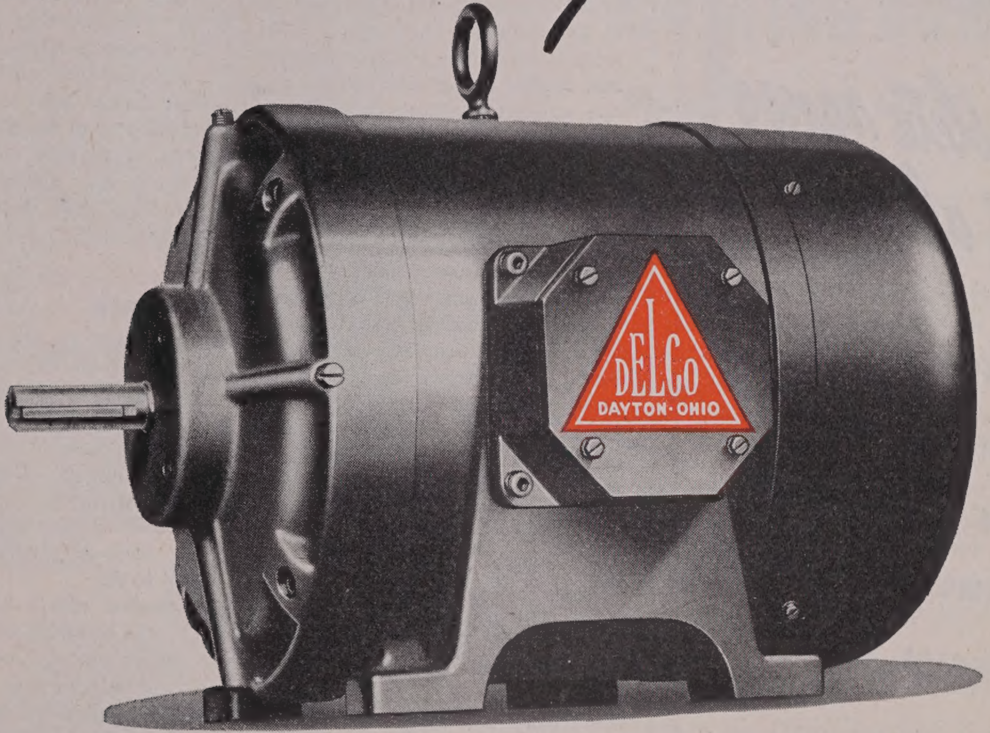
THE ROTOR TOOL CO.

CLEVELAND, OHIO

UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEMS

DELCO MOTORS

Eliminate costly down-time



Do away with profit-eating down time! For dependable power, depend on Delco to provide industrial motors that stand up to their job . . . motors able to withstand the attacks of dirt and dampness, yet requiring the very minimum of maintenance.

Delco totally enclosed fan-cooled motors are produced in sizes ranging from fractional ratings to 75 h.p. (Continuous duty, constant speed, 60 cycle, polyphase.)

The Delco totally enclosed fan-cooled motor assures continuous, trouble-free power. Special features of Delco design—locked bearings, Delcote coil insulation, corrosive-resistant cast iron frame, positive lubrication, dynamically balanced rotor and shaft assembly, water-tight four-position conduit box—contribute to reliability and to economy of operation.

So, eliminate costly down-time . . . investigate the Delco industrial motor line. There's a Delco that's RIGHT for your job.

For complete data on Delco Motors, address Delco Products, Dayton, Ohio, or our nearest sales office.

DELCO MOTORS

DELCO PRODUCTS, DIVISION OF GENERAL MOTORS CORPORATION
SALES OFFICES: CHICAGO • CINCINNATI • CLEVELAND • DETROIT • HARTFORD, CONN.

DELCO PRODUCTS DAYTON, OHIO

Anaconda
PHOSPHOR BRONZE

Complete range of alloys

IN SHEETS
PLATES, STRIPS,
WIRE, RODS, BARS,
SEAMLESS TUBES &
SPECIAL SHAPES

The American Brass Company offers Anaconda Phosphor Bronze in 10 standard compositions (including a free-cutting alloy) with tin content ranging from 1.25 percent to 10.5 percent.

Tell us what you make and how it's used. Our Technical Department is at your service in helping you select the correct alloy, the most serviceable temper, the most economical form. 48269

ANACONDA
from mine to consumer

THE AMERICAN BRASS COMPANY
General Offices: Waterbury 88, Connecticut
Subsidiary of Anaconda Copper Mining Co.
In Canada: ANACONDA AMERICAN BRASS LTD., *New Toronto, Ont.*

HIGH
TENSILE STRENGTH
ELASTIC LIMIT
RESISTANCE TO FATIGUE
RESISTANCE TO CORROSION
RESISTANCE TO WEAR

Fatigue Cracks

BY C. T. POST

" . . . grind exceeding sure"

• • Pinch-hitting for Mr. Post in his absence offers a perfect opportunity for all those members of the staff of your f.f.j. who harbor grudges against this weekly column to get them off their chest. Perhaps it should be a brief biographical sketch of Charlie Post—as he has written about almost everyone else on the staff one week or another.

Charlie's present occupation is slightly complex—he is circulation manager with his right hand, readers' service answer man with his left, and he works this column out of his hip pocket. At the same time, he is a professional Californian. His meteoric career with this publication started with west coast reporting, and although he served as Chicago editor before coming to New York, his soul still belongs to the Golden Gate. It is tragic circumstance, but asking Charlie a question about the West is to change a fascinating conversationalist into the perfect bore. Of course, there is always the haunting possibility that he may be telling the truth about California, but we intend not to go there to be proven wrong.

Bucking The Trend

• • A million words being written about the faults of poll taking haven't disturbed the calm in our market research division in the slightest. The day after election Director of Research Oliver Johnson was in Boston, haranguing an audience on a new research project, Basic Marketing Data on the metalworking industry which he has just completed. Of course Mr. Johnson had a priceless asset in his own project . . . he did what Mr. Roper didn't. Mr. Johnson actually polled every plant in the metalworking for his study—just to be on the safe side.

Sniffometer

• • Washington can be depended on almost any week to add materially to our collection of earthshaking press releases. The latest we have seen is an important one describing "metazene," which we had never heard of and can't buy, which is a miracle weapon to kill odors. As the scientist responsible for the discovery points out, "American men like their women to smell exotic, but not their homes." We gather further inference that the millions our wives spend for soap, perfume, and incense will be rendered unnecessary by this new smell eliminator. Fat chance, wait till the soap opera trust gets to work on this one. By way of further enlightenment the release says it was discovered in a building that dates back to the 1700's.

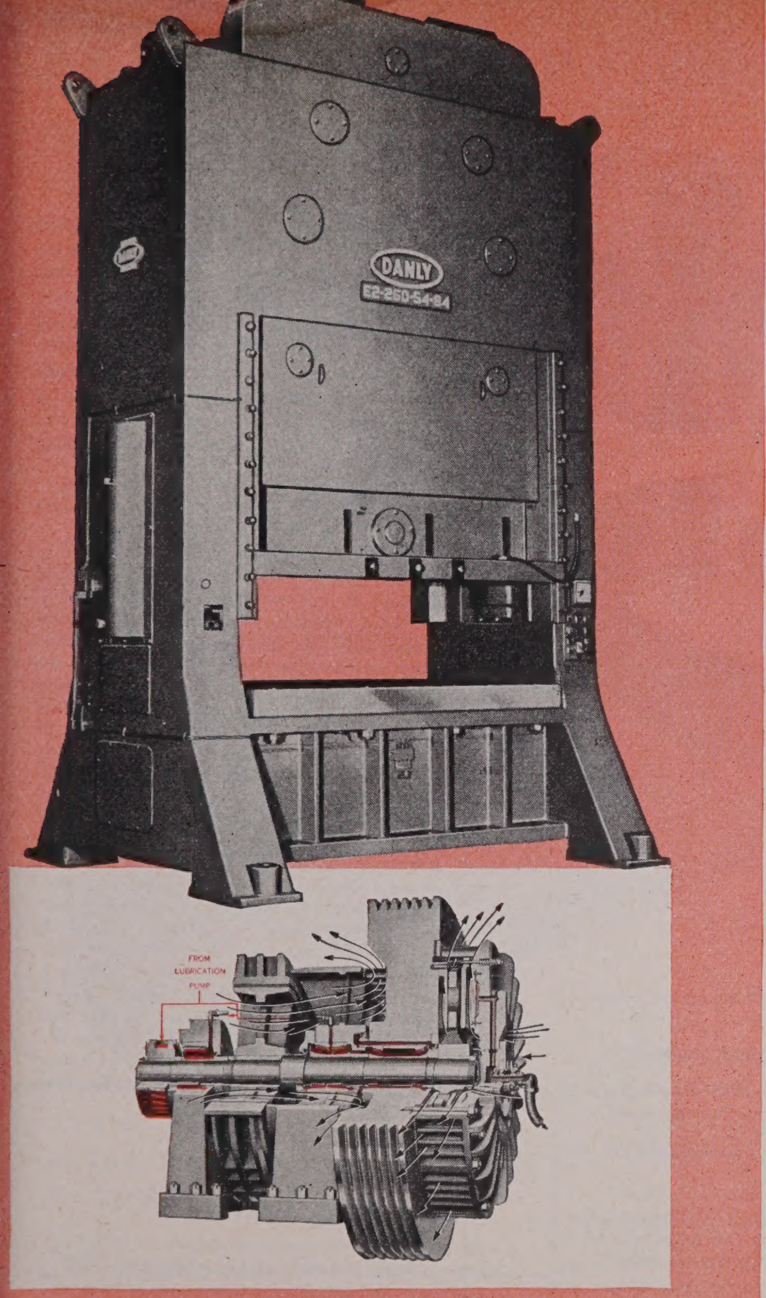
Glossary

• • While we are thinking of such things, some one down on the news desk has pasted this up over the new man's desk:

handout — mimeographed sheet hopefully distributed to the press.
boiler plate—pretty sticky stuff used only when there is space to fill.
stuffed shirt—he believes what the handout says about him.
scoop—story that excites only the man who gets it.
announcement—a handout.
important development — something most people know, or if they don't, they don't care.
press conference — full dress sounding board with backfires.
plant—a spokesman's story given to one newsman on the basis that he is getting it first—and that it is the real thing. It never is.
PR — a frustrated man who knows why and how but is usually bound and gagged.

Could be Worse

• • Sad purchasing agents who are having delivery troubles on electric motors can take some slight solace from the article in the news section on the new blooming mill for Austrian steel. An American steel mill equipment manufacturer got the nod because if the mill were to be built in Germany it would take two years—and the motors would have to come from Switzerland, please allow us three years for their delivery. They plan to get them from the U. S. A. in 16 months. (J.R.H.)



NEW DANLY CLUTCH INCREASES PRESS PRODUCTION BY CUTTING DOWNTIME

Main Mass of Clutch Rotates with Flywheel

Vastly different from conventional press clutches, most of the mass of the Danly Clutch is assembled directly to the flywheel. The actual weight of clutch members "picked up" by the flywheel in the clutching operation is about 1/7 that of ordinary clutches. The comparatively light weight of the parts started by the flywheel upon engagement reduces the load on the motor and driveshaft. Accordingly, less heat is generated.

In addition, solid friction discs are used which have a greater wearing surface than riveted linings. *In tested operation under load, more than 8,000,000 successive clutch engagements failed to make replacement of the original discs necessary.*

High Velocity Ventilation

Further, the clutch housing is designed to provide high velocity ventilation, which together with the automatic built-in lubricating system providing filtered oil to all drive shaft members, insures long trouble-free service, less downtime and more production at lower costs.

5 Cost-Saving Features of DANLY PRESSES

Built-In Automatic Filtered Oiling System—Puts right amount of oil where needed—*including flywheel bearings.* Increases press life—conserves oil.

Sturdy All-Steel Welded Frame—All weldments stress relieved before machining—insures accurate, permanent alignment.

Safe, Convenient Electrical Controls—Save time on die adjustments—increases operator safety.

Extra Long, Bronze-Lined Adjustable Gibs and Precision Machined Slide—Assure long operating precision.

Pitman Wrist-Pin Design—Permits precision fitting of component parts, assures closer operating tolerances, and continuing alignment.

Get More Facts Today on Danly's Cost-Saving Features

DANLY
1, 2 and 4-POINT
STRAIGHT-SIDE
PRESSES
The Press for Modern Production

Write for this free folder. Ask for facts on other Danly engineering features. Danly Presses are available in a range of capacities of 50 to 3,000 tons.

Engineering Service

Call on Danly engineers for assistance in determining the most efficient press for your production. For specific information, send details about your problems. No obligation.

DANLY

DANLY MACHINE SPECIALTIES, INC.
2100 SOUTH 52ND AVENUE CHICAGO 50, ILLINOIS

25 YEARS OF DEPENDABLE SERVICE TO THE STAMPING INDUSTRY

PRECISION DIE SETS...STANDARD AND SPECIAL ● MECHANICAL PRESSES AND PRESS EQUIPMENT

COPPER COATED THOMASTRIP

combines the strength of STEEL with bearing quality of BRONZE

Thomas cold rolled strip conforms to the specifications of a bearing manufacturer:

(1) because of the steel's uniformity of gauge,

(2) because ThomaStrip pre-coated with copper may be used as a base for bonding bronze to the steel,

(3) because the pre-coating resists corrosion during fabrication.

The manufacturer advertises "The strength of steel with the bearing quality of bronze." Pre-coated ThomaStrip not only aids the manufacturer in producing this product benefit, but it also permits lower manufacturing costs. Thomas engineers will gladly work with you to develop advantages for product or production . . . or both.

ELECTRO-COATED ZINC, COPPER, NICKEL, AND BRASS . . . HOT DIPPED TIN AND LEAD ALLOY . . . LACQUER COATED IN COLORS . . . UNCOATED PRECISION STRIP . . . CARBON AND ALLOY SPECIALTIES.

THE THOMAS STEEL CO. • WARREN, OHIO
COLD ROLLED STRIP STEEL SPECIALISTS

ThomaStrip
COLD ROLLED STRIP STEEL
REG. U. S. PAT. OFF.

Dear Editor:

LIME AND LIMESTONE

Sir:

Would you be kind enough to familiarize us with the general requirements of the basic openhearth and electric furnace steel makers in your country as regards lime—its analysis, size, etc. . . . Do you know some American books or magazines dealing specially with the quarrying and burning of limestone? Could you give us the names of some companies making such equipment?

L. CANTINIAU
Secretary-General

Societe Anonyme des Usines Gilson
La Croyere, Belgium

● Analyses of different grades of limestone as used in the openhearth can be found in the book, "Making, Shaping, and Treating Steel" published by Carnegie Illinois Steel Corp., Pittsburgh. For information on aspects of different composition and of sizing in the openhearth, we suggest a technical paper entitled "Limestone and Lime of Openhearth Quality" by D. E. Washburn, published in the Proceedings of the 29th Conference, 1946 National Openhearth Committee of the Iron and Steel Div., American Institute of Mining and Metallurgical Engineeers, 29 West 39th St., New York. In the same volume is a discussion of "Limestone Solution in the Basic Openhearth Furnace" by Michael Tenenbaum and J. S. Griffith. A magazine, "Rock Products" published at 309 W. Jackson Blvd., Chicago 6, covers quarrying in general, including limestone. A similar publication is "Pit and Quarrying" published at 538 S. Clark St., Chicago 5. We are mailing a list of manufacturers of quarry equipment and lime kilns.—Ed.

PRECISION CASTING

Sir:

I am investigating precision casting and would appreciate a copy of "Precision Casting at Allis Chalmers" from your June 3 issue.

R. W. LEATHERS

Milwaukee

MACHINERY FOR CALCUTTA

Sir:

We have decided to start a factory to manufacture all sorts of hardware materials in India and shall appreciate it if you will give us the names and addresses of manufacturers from whom we may be able to purchase the equipment. Our requirements are for the manufacture of wood screws, bolts and nuts, ply wood, nettings, hinges, tower bolts, pad locks, saws, files, chains, nails, fans, etc.

SHAMLALL & BROS.

Calcutta, India

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WHAT THE AIR-GAGE TRACER PACKAGED UNIT DOES

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- Combines the power and flexibility of a fast, modern engine lathe with automatic template control of size and shape.
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This new Packaged Unit, applicable as factory equipment on standard Monarch Engine Lathes, combines the time-saving, cost-cutting advantages of the Air-Gage Tracer with a variable feed and rapid-traverse return, making a completely-automatic cycle lathe. The result is a precision machine that provides maximum production on single pieces or large-lot runs—at a reasonable initial investment cost.

If your production includes multiple-diameter shafts, or the turning, boring or facing of contours, it will pay you to investigate the savings made possible by Air-Gage Tracer Packaged Unit Operation. Get the full facts *now*. Ask for bulletin 2604.

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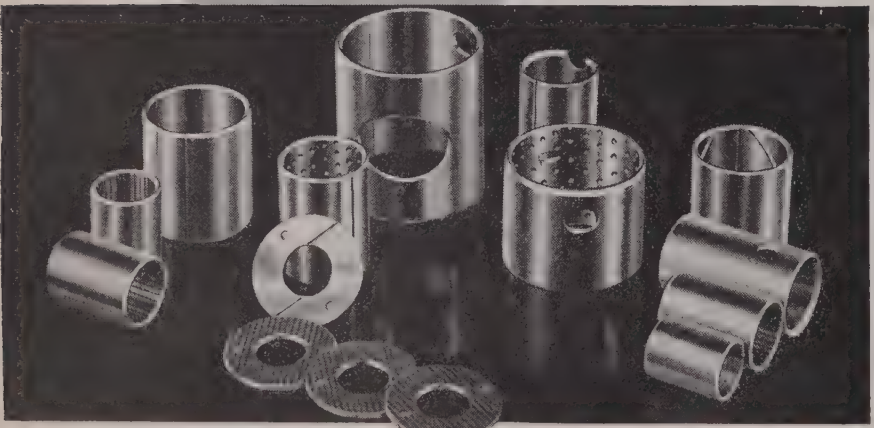

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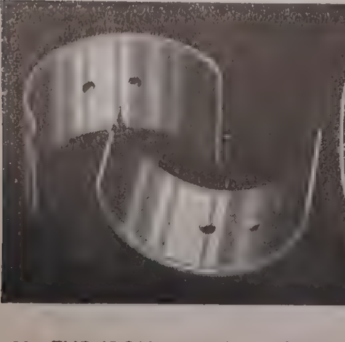

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BRONZE
SLEEVE BEARING HEADQUARTERS
BRANCHES IN
20 INDUSTRIAL
CENTERS

such as locks and fans, require several special types of machinery, determined by the design of the product.—Ed.

COMPARATIVE TOOL STEELS

Sir:

This office would appreciate receiving tear sheets of the table "Comparative Tool Steel Brands," if available, which appears on pp. 79-81 of the July 29 issue.

MAURICE J. CURTIS
Supervisor, Materials Engineering Laboratory
U. S. Naval Ordnance Test Station
Inyokern, Calif.

● Reprints of the table have been made and a copy has been mailed to you.—Ed.

AS-CAST STRUCTURES

Sir:

We should be glad if you could let us have two reprints of the article headed "As-Cast Structures in Cast Steel," by M. F. Hawkes and B. F. Brown, as published in your Oct. 14, 1948 issue. You will perhaps be interested to know that your publications arrive safely, but somewhat haphazardly. Sometimes two come together, but this may be due to shipping or postal holdups.

H. HICKS
Managing Director
Sheffield Forge & Rolling Mills Co., Ltd.
Sheffield, England

BALL BEARING STEELS

Sir:

How may I obtain a copy of "Metallurgical Aspects of Ball Bearing Steels" by A. S. Jameson in the Sept. 2, 1948, issue. I am a student at Massachusetts Institute of Technology and a member of the Air Force Reserves, and I am of the opinion that I may benefit from the article.

E. W. PETTITT
Cambridge, Mass.

● We're happy to forward you, gratis, tear sheets of the article.—Ed.

SPARK TESTERS

Sir:

Will you please send us three copies of each of the following articles "Training Spark Testers," from your July 18, 1946, issue: "Quick Methods for Identifying Metals," from the Oct. 17, 1946, issue; and "Permanent Mold Casting of Copper Base Alloys," from the July 22, 1948, issue.

ROGER R. LAUZON
Vice-President
International Tools, Ltd.
Windsor, Ontario

X-RAY ANALYSIS

Sir:

Please send tear sheets of the article "X-Ray Fluorescence Analysis," from the Oct. 28 and Nov. 4, 1948 issue. Also, if still available, the article "Quick Methods for Identifying

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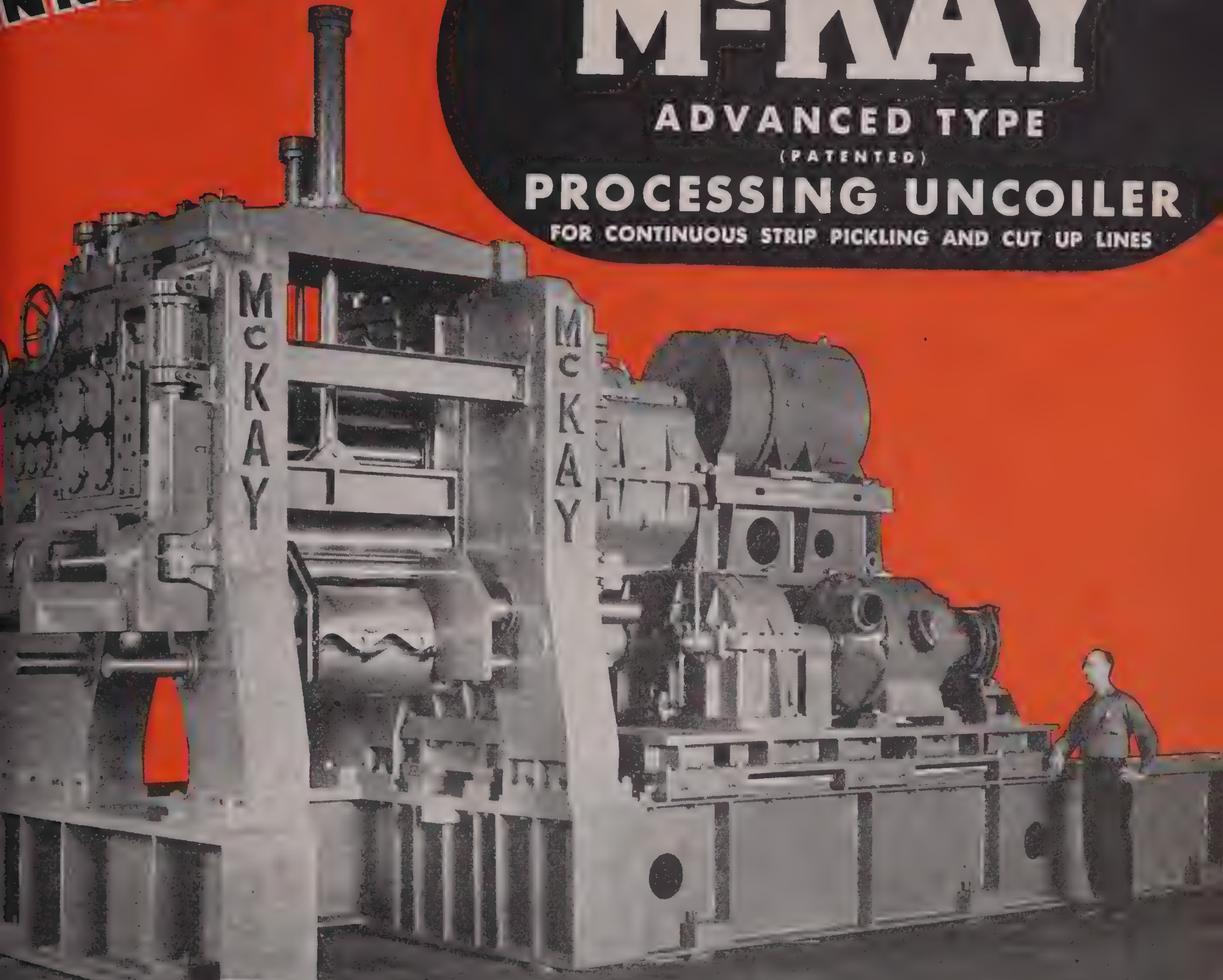

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Metals," which appeared in the Oct. 17, 1946 issue.

T. R. MORRIS
Chief Chemist
Northern Pigment Co., Ltd.
New Toronto, Canada

CYCLE ANNEALING

Sir:

Please send me ten copies of the article "Controlled Atmosphere Cycle Annealing" appearing in the Sept. 9 issue.

T. U. GATES
Asst. Supt., Heat Treating and Cold Finishing Depts.
Bethlehem Steel Co.
Bethlehem, Pa.

CUPOLA HOT METAL

Sir:

Please send us tear sheets of "Cupola Hot Metal for the Openhearth" from the Oct. 21 issue.

CHAS. L. McGRANAHAN
Asst. General Superintendent
Jones & Laughlin Steel Corp.
Pittsburgh

HARD FACING

Sir:

I wonder if it is possible for me to obtain a copy of Roy D. Haworth's article, "Effect of Welding Practice on Abrasion Resistance of Hard Facings." This article appeared in the Oct. 7 issue.

J. J. JARMS
Welding Engineer
Jet Propulsion Div.
Thompson Products, Inc.
Cleveland

PERMANENT MOLDS

Sir:

We would appreciate receiving tear sheets on the article "Permanent Mold Casting of Copper Base Alloys," which appeared in the July 22 issue.

SEYMOUR TROY
Eastern Metal Products Co.
Tuckahoe, N. Y.

● Tear sheets of the article, which is a review of British practice in casting copper base alloys in permanent molds, have been forwarded.—Ed.

EXACT ADDRESS

Sir:

We would appreciate it if you would send us the exact address of the Elliot Co., Jeannette, Pa.

SOCIETE ANONYME DES GAZ INDUSTRIELS
Haren-Nord
Belgium

● Mail addressed to the Elliot Co., Jeannette, Pa., would reach them.—Ed.

STANDARDS DEPT.

Sir:

I have read with much interest the article in the Sept. 2 issue "The

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SOLUTION: Use Oakite Composition No. 90. High conductivity combines with wetting and emulsifying action to remove buffing compounds, cutting oils, light grease, solid-particle dirts. No brushing or wiping. Fine bubbles of solution trap troublesome alkaline spray raised by gassing at electrodes. Bubbles form thin blanket, then break before becoming thick layer of explosive foam. Long solution life. FREE data sent on request.

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☐ BURNISHING

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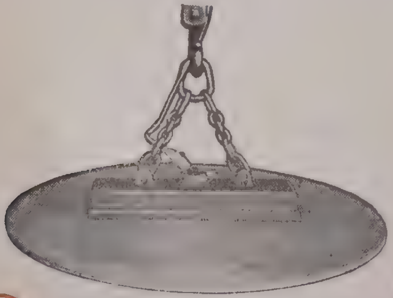

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Standards Department—Its Organization and Function." May I kindly have a reprint of this article . . .

S. MILLS
Engineering Dept.
Trans. & Spec. Div.
Canadian General Electric Co.
Toronto

ELECTRODE SPECS

Sir:

Please send me tear sheets of the article "New Welding Electrode Specifications" which appeared on p. 70 of the Oct. 28, 1948 issue.

GAYLE DAHMER
Research Librarian
American Smelting & Refining Co.
Barber, N. J.

OXIDE FILMS

Sir:

I would appreciate very much receiving a tear sheet or reprint of the article entitled "Metal Oxide Films at Elevated Temperatures, by J. W. Hickman, which appeared Aug. 19, 1948, p. 90.

M. JACOBSON
Chemical Engineer
Laboratory, Watertown Arsenal
Watertown, Mass.

X-RAY ANALYSIS

Sir:

We should appreciate tear sheets on the article "X-Ray Fluorescence Analysis" in the Oct. 28 issue.

BOYD G. ROLAND
Asst. Director of Research
International Industrial Development Organization
Los Angeles

PRODUCTION CONTROL

Sir:

We would appreciate your mailing us a copy of "Putting Production Control to Work" as it appeared in your May 16, 1946, issue.

B. F. GALLE
Production Manager
Ice Cooling Appliance Corp.
Chicago

CASTING COPPER ALLOYS

Sir:

I have read with interest the article on "Permanent Mold Casting of Copper Base Alloys" appearing in the July 22 issue and would like to obtain a copy of it.

CHESTER A. MARCOWKA
Ceramic Research & Development
A. O. Smith Corp.
Milwaukee

OLSON TESTER

Sir:

Please tell us the name of the company which makes the Olson machine used for testing the drawing quality of steel.

JOHN B. DOLAN
President
T. J. Rafferty & Co., Inc.
Worcester, Mass.

● It's Tinius Olson Testing Machine Co., Easton Road, Willow Grove, Pa.—Ed.

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The
IRON AGE

Vol. 162, No. 24 December 9, 1948

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December 9, 1948

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A Test for Planners

ONE of the more doubtful consolations with which defeated Republicans are comforting themselves is the certainty that the next four years will see a decline in business for which the Democratic Party will be blamed.

It is known that the economic advisers of the administration are already wrestling with the problem of timing and procedure. There is no disposition to let events run their natural course and develop their own cures as they have during the "unenlightened" past. America has shed the philosophy of *laissez faire* and accepted an "affirmative responsibility" toward the national economy. No practical purpose can be served by deploring this change. Had the Republicans won in November they would have approached the problem in precisely the same manner.

The businessman will be well advised, however, to examine any proposed program to "stabilize" the economy. Within the limits feasible for a democracy, can such a program be effective? Of one thing we may be sure. It will involve the expenditure of public funds. The rationalization of deficit financing as depression therapy is so far advanced in this country that any opposition on sound lines is futile. Those of us who may not like it might just as well relax and, within the limits of our circumstances, make the best possible adjustment.

It should be pointed out, however, for the benefit of both advocates and opponents of "compensatory public finance" that it has never had a real test. On the only occasion in American history when it was deliberately used, i.e., in the thirties, it fell flat on its face. That entire decade remained subnormal in spite of the heroic fiscal heresy of the government. The effort was crowned in 1937-38 by a sharp depression, singular in business cycle history for its exclusive incidence in this country. A final judgment on the policy of spending for recovery was precluded by war.

It is now believed by administration advisers that an increase of $2 billion to $3 billion in armament outlay and a similar amount for public works or greater foreign aid would offset any business decline of the size anticipated. Let's look at this.

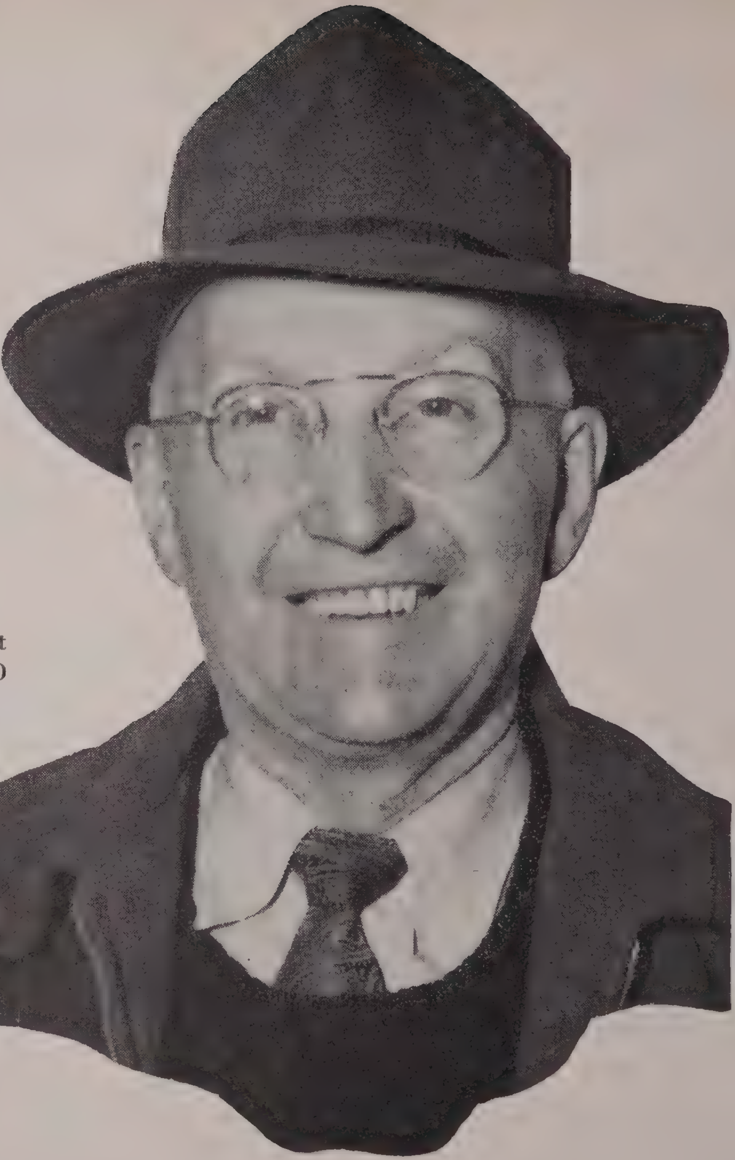
Business forecasting is far from an exact science. A number of our leading soothsayers predict a 10% decline in business volume next year, with heavy industry, reflecting armament and continuing capital expenditures, standing up much better than they ordinarily do in a depression. Gross national product for the current year may be slightly in excess of $250 billion. A 10% decline would represent $25 billion in diminished production.

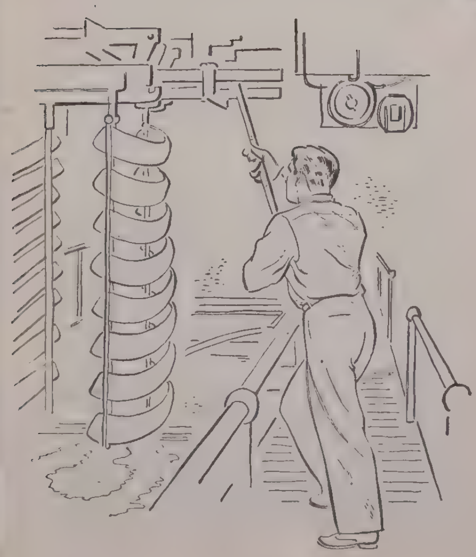
Furthermore, a drop of even 10% in gross national output would have a far greater effect on corporate income and a still greater relative effect on Federal revenue. In fact, such a decline in business might easily reduce Uncle Sam's income by as much as $15 billion. Assuming no compensatory spending, this would leave a deficit of $15 billion in the budget. A precise effort to match the projected $25 billion decline in business volume would raise the total deficit to $40 billion. Is this what the planners have in mind?

Joseph Stagg Lawrence

"I like the UNIFORMITY of Inland Steel"

Electroplaters know how much time can be wasted in unnecessary grinding and polishing when the steel they shape and plate *varies* in surface structure. These men prefer steel that's *uniform*. That's why they like steel *made by Inland*. Uniform source of raw materials . . . uniform steelmaking procedures using the same modern equipment . . . uniform workmanship—made possible by Inland's completely integrated, closely knit plant—explain why the Inland steel received today will be of the same uniform quality as that received last month . . . or last year. INLAND STEEL CO., 38 S. Dearborn St., Chicago, Ill. Sales Offices: Chicago, Davenport, Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul.





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IRON AGE

NEWSFRONT

December 7, 1948

► The Truman Administration is not expected to oppose legislative action to straighten out the delivered pricing problem. A hands-off policy is likely to prevail. Only concrete statement from high administration sources is to the effect that regardless of merits of controversy "it could not have arisen at a worse time" from the standpoint of its inflationary aspects.

► What is believed to be the largest order of its kind--one for 400 tons of stainless steel wire--has recently been booked by Allegheny Ludlum. It will be used by U. S. Army Engineers as reinforcement and tie wires for concrete mats on the Mississippi River flood control project.

► Investigations of actual machining time against total cycle time by a milling machine department of a machine shop showed that only 12 to 15 pct of total time was consumed in actual cutting. While this is likely low from the standpoint of machining in general, it does indicate the extreme need for faster workpiece handling into and out of the machines, and better arrangements for setup and workpiece clamping so that downtime of the machine itself will be reduced.

► The latest move in the drive to reduce production costs for nonferrous metal tubing is the establishment of a mill for the electrodeposition of copper and alloy tubing. The mill is not yet ready for production. But it is expected to result in savings by the elimination of piercing and tube mills, and annealing and pickling stages. Other developments in this direction include the use of heavy extrusion presses for brass tubing and the use of dual and triple tube drawbenches.

► During this year of export controls, exports of iron and steel products will be about one-third less than last year. Exporters are bemoaning the fact that quotas of some specific products have not been entirely taken up. But they point out that by the time this becomes known to them it is too late to get a license for that period. The time lost in getting applications for getting licenses processed is still the most harassing feature of export controls.

► Informed sources believe that the number of cars having bonded brake linings in place of riveted assemblies will be increased substantially during 1949. Bonded brake linings have been used on trucks for several years but their use is expected to be greatly extended in the passenger car field.

► A high temperature alloy originally developed for jet turbine bucket wheels has moved into the cockpit of aircraft where it will be used on critical parts of cabin heaters.

► Railroads are quietly investigating the extent to which truck lines are cutting into their freight revenues--and in which geographical areas. Shipping by truck last year totaled about 86 billion ton-miles, a jump of nearly 30 billion over a 2-year period. This is the fastest as well as largest increase in trucking history.

► Latest application of induction heating is for descaling steel bars. By using the fast heating rates, expansion of the layer of surface scale causes it to snap off. So far this application of induction heating is in the experimental stage. But preliminary tests show encouraging results.

► ODT director Johnson is still plugging for 14,000 freight cars a month. In a letter received by steel men and others last week, he castigated the Office of Industry Cooperation for going along on the current 10,000 car-a-month program. On Nov. 9, Col. Johnson said there were 12 months' orders on carbuilder's books. An IRON AGE check finds no carbuilder with a 12 month backlog. Most have 4 or 5 months work ahead at best.

By EUGEN PIWOWARSKY
Aachen, Germany

TABLE I

Charpy Impact Values

Reinforcement, pct	Impact Average, ft-lb per sq in.
None	41.1
5.7	153.5
5.2	163.8

TABLE III

Dependence of Tensile Strength on Pouring Temperature

Pouring Temperature, °F	Tensile Strength, psi
2190	23,000
2300	26,500
2410	36,500

TABLE II

Summary of Average Values of Bend Strength, Tensile Strength and Deflection, and Pct Change in Strength of Reinforced v. Unreinforced Bars

Where not otherwise given, diam of bar = 1.2 in.

Test	Type Reinforcement	Reinf. Coefficient, pct	Bending Strength, lb per psi	Increase in Bend Strength	Deflection, in.	Increase in Deflection, pct	Tensile Strength, psi	Increase in Tensile Strength, pct
A	None	0.0	55,720	.....	0.405	.....	35,800	.....
	Wire 1	0.64	56,560	1.5	0.421	3.9	37,800	5.6
	Wire 2	1.90	56,000	0.5	0.409	1.0	39,520	10.4
B	None	0.0	62,100	.....	0.360	.....	34,000	.....
	Wire cable 3	0.66	68,000	9.5	0.372	3.3	35,500	4.6
C	None	0.0	56,000	.....	0.360	.....	37,200	.....
	Wire 4	3.00	56,800	1.4	0.450	25.0	40,500	8.8
	Wire 4 (flat-rolled)	3.00	56,140	0.3	0.440	22.2	30,250	−18.7
	Wire 5	3.12	57,450	2.6	0.450	25.0	30,550	−17.9
D	None	0.0	54,600	.....	0.400	.....	32,550	.....
	Wire 4	3.00	60,960	11.6	0.424	5.9	31,350	−3.7
	Wire 4 (flat-rolled)	3.00	57,250	4.9	0.412	3.0	31,650	−2.7
E	None	0.0	62,500	.....	0.416	.....	38,500	.....
	Wire 4 (flat-rolled)	3.00	63,250	1.2	0.431	3.7	39,200	1.8
	Wire 5 (flat-rolled)	3.12	67,300	7.6	0.478	14.8	38,900	1.1
	Bar and wire 5[1]	3.12	75,800	21.3	0.634	52.7	41,050	6.6
F	None	0.0	48,400	.....	0.310	.....	20,200	.....
	Wire 1	0.64	47,450	−2.0	0.306	−1.3	19,800	−2.0
	Wire 1[2]	1.08	53,600	10.8	0.275	−11.3	21,500	6.5
	None	0.0	52,800	.....	0.392	.....	27,800	.....
	Wire 1	1.64	57,500	8.9	0.370	−5.6	30,700	10.3
	Wire 1[3]	1.64	61,200	15.9	0.431	10.0	28,650	3.1
G	None	0.0	47,600	.....	0.321	.....	20,800	.....
	Wire 4	3.00	53,300	10.2	0.391	22.0	25,900	24.5
	Wire 5	3.12	54,300	14.2	0.361	12.4	29,950	44.0
	Wire 4	3.00	54,850	16.3	0.411	28.0	25,900	24.5
	Wire 4 (flat-rolled)	3.00	50,600	6.3	0.370	15.3	25,900	24.5
	Wire 5	3.12	52,650	10.6	0.352	9.8	29,950	44.0
	Wire 5 (flat-rolled)	3.12	56,100	17.8	0.370	15.3	29,950	44.0
H	None	0.0	50,000	.....	0.351	.....	26,000	.....
	Wire 5	3.12	61,200	22.3	.....	.....	32,750	26.0
	None	0.0	41,500	.....	0.267	.....	19,000	.....
	Wire 5	3.32	53,100	28.0	0.364	36.2	24.400	28.4
	Wire 5[2]	5.28	55,600	34.0	0.368	37.8	23,000	20.9
I	None	0.0	52,500	.....	0.370	.....	No test	
	Wire 5	3.12	61,500	17.1	0.417	12.6	......	.....
	Wire 5 + *D* (33 cu in.)	3.12	66,900	27.5	0.459	24.2	......	.....
J	None	0.0	47,300	.....	0.349	.....	No test	
	Reinf. 6 + *D* (33 cu in.)	7.1	54,250	14.7	0.388	11.1	......	.....
	Reinf. 6 + *D* (61 cu in.)	7.1	56,100	18.6	0.562	61.2	......	.....
	Reinf. 6 + *D* (134 cu in.)	7.1	57,200	21.0	0.620	77.8	......	.....
K	None	0.0	47,300	.....	0.240	.....	No test	
	Square iron bar	5.3	51,200	8.1	0.258	7.5	......	.....
	Square iron bar[3] + *D* (134 cu in.)	5.3	58,100	22.8	0.240	0.0	......	.....
L	None	0.0	47,000	.....	0.392	.....	No test	
	Wire 4 + *D* (134 cu in.) single wire	3.0	51,000	8.5	0.353	−10.0	......	.....
	Wire 4 + *D* (134 cu in.) two wires	6.0	53,250	13.3	0.470	20.0	......	.....
	Wire 4 + *D* (134 cu in.) three wires	9.0	59,900	27.5	0.441	15.0	......	.....

[1] Not considered in averaging.

[2] Test bar diam = 1.6 in.

[3] Insert coated with powdered 98 pct ferrosilicon and water-glass paste.

D—Flow-off of an extra amount of iron from the mold for improvement of fusion.

REINFORCED CAST IRON

Reinforcement of cast iron with cast-in steel inserts offers interesting possibilities for weight and material savings in structural shapes, pipe and other applications. Increases in strength obtainable by this technique, and the effectiveness of various types of reinforcing media and pouring methods are reported in this first section of a two-part article. Comments on some early work done by the Russians, who have indicated particular interest in the subject, are included.

IN 1938 a report[1] appeared describing a watch tower erected at the instigation of Peter the Great of Russia in the year 1725. The tower is still standing and legends regarding its strength and stability have been circulated for generations. The tower was found to be built of cast iron reinforced with steel.

In recent years, the material, designated in Russia as "steel-cast iron," is supposed to have led the Soviet Union to appropriate large sums for further research into this reinforced cast iron. Presumably successful tests were made with reinforced plates, beams, tunnel segments, molds, cooling frames for openhearth furnaces, supporting rings for blast furnaces, cast iron foundry flasks, telegraph poles and other parts. Reinforced pipe poured in the Stankolit Works had a weight of 700 lb compared to 1450 lb without reinforcement. For one segment, a 50 lb armature was used. The bearing strength should have been increased about 40.5 pct compared with conventional pipe of unreinforced cast iron. For a tunnel nearly ⅝ mile long, 4800 tons of cast iron were allegedly saved.

Translated and abstracted by J. S. Vanick and H. H. Tanner, International Nickel Co., New York.—Ed.

Calculations are supposed further to have led to the conclusion—not too convincing, to be sure—that reinforced cast iron construction should be 50 to 75 pct cheaper than reinforced concrete and 35 to 45 pct cheaper than steel construction. Therefore, Russia planned to extend the use of reinforced cast iron to the production of tunnel rings for underground tracks, railway passages in tunnels, span bridges, lighting poles and other parts. Lewanow[1,2] has reported some investigations which were conducted under the supervision of the Central High School of Scientific Research. Parallel tests were also conducted in the Laboratory of the Industrial Academy by L. Kaganowitsch[2]. Various types of cast iron beams 2.4x3.9x39 in. reinforced as shown in fig. 1, were tested and the results of bending

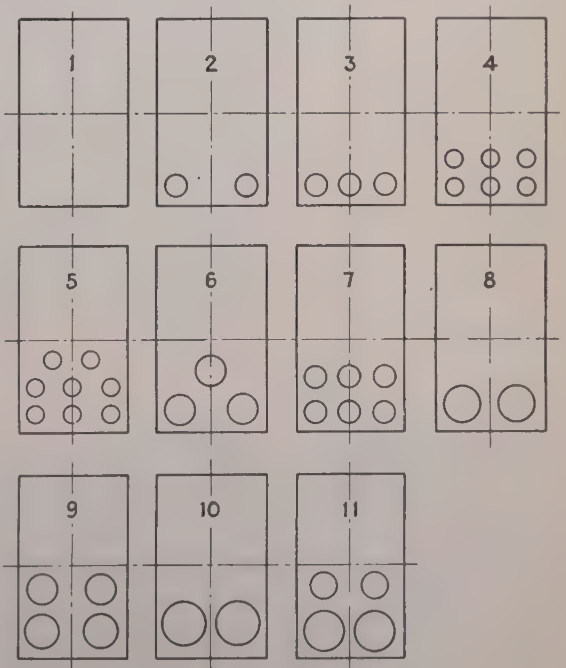
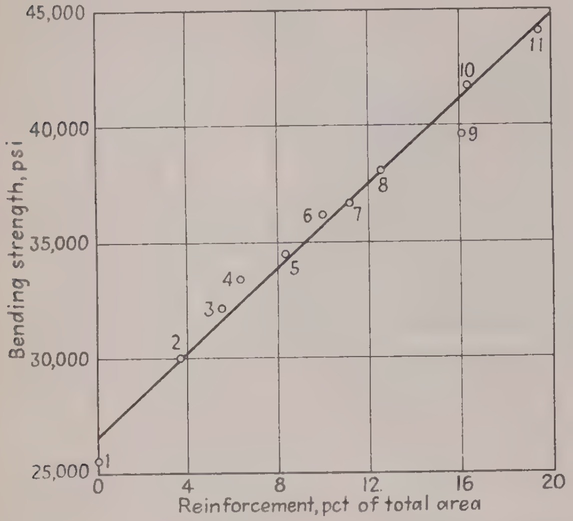


FIG. 1—Shape and reinforcement of cast iron bend beams tested by Lewanow. Diagrams show the position of reinforcing rods in each test specimen

tests on these beams, with 3.75 to 19.3 pct reinforcement, are shown in fig. 2. The cast iron was poured at 2280° to 2520°F. The reinforcement material was a plain carbon steel with 0.10 to 0.25 pct C. The span in these tests was 31 in. Soon after the appearance of the Russian report, the author began work on the problem of the reinforcement of cast iron. Some references were available in connection with the reinforcement of cast iron chill-cast rolls.



ABOVE

FIG. 2 — Bending strength of the test beams shown in fig. 1 plotted against percent of the beam area reinforced.

The greater strength and modulus of elasticity of the steel reinforcement is seen to result in the prospect of preferential absorption of tensile stresses by the inserts and the releasing of the stresses to the surrounding cast iron with its considerably smaller modulus. The firm Gebr. Sulzer in Winthur, Switzerland, has made use of this relationship in the production of crankshafts to insure them against breakage[8]. The steel inserts are used to relieve the base material in zones of probable stress concentration and distortion.

Complete fusion with the steel inserts is necessary for best results. Preliminary tests revealed that if an incomplete fusion resulted, a decrease in load carrying capacity of bars, beams and composite structures occurred. However, even in the case where an intimate fusion existed, decreases in breaking load often occurred if a distinct carbide network was observed in the fusion zone. This led the author to choose as reinforcement steel-type materials which possessed a high silicon content so that the formation of a brittle, cementite network was avoided and a soft transition zone containing only pearlite and graphite formed instead. Inserts with too high a silicon content, as when dynamo and transformer materials were used, were inferior because of inadequate toughness and primarily because of recrystallization and excessive grain growth. Steels rich in silicon do not fuse well. Hence, the

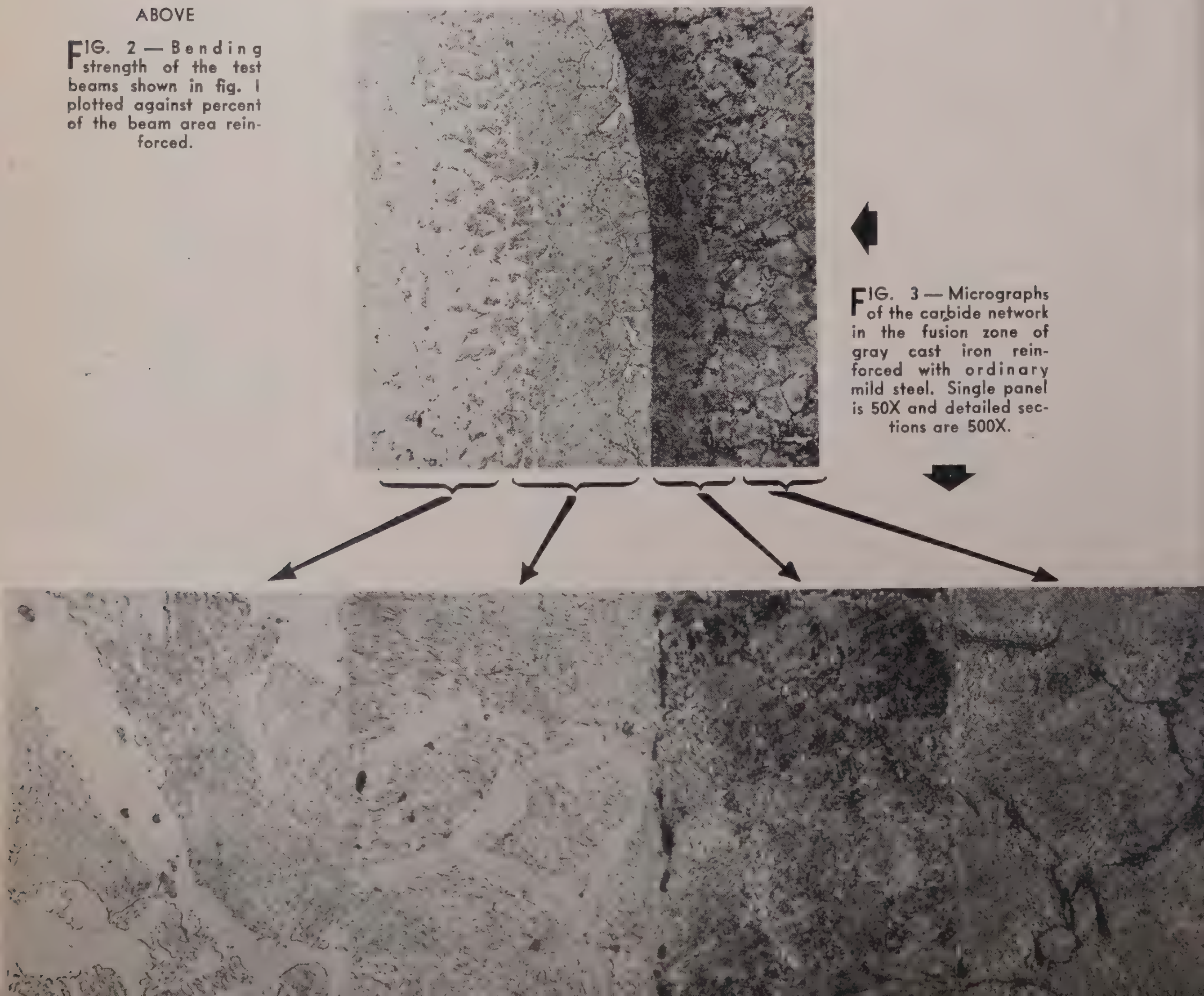


FIG. 3 — Micrographs of the carbide network in the fusion zone of gray cast iron reinforced with ordinary mild steel. Single panel is 50X and detailed sections are 500X.

author proposed the use of inserts with a silicon content over 1.5 pct but under 3 pct, in tube, strip or wire form. The best reinforcement materials proved to be those within this silicon range and in a 0.25 to 0.65 pct carbon range[4]. A ferrosilicon rich powder has also been proposed as a coating for larger reinforcements to ensure fusion.

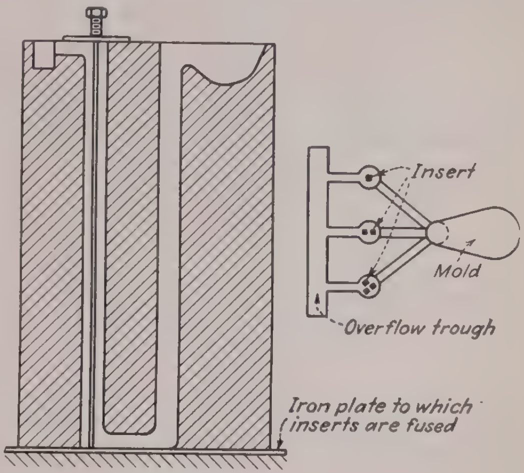
Reinforced cast iron increases not only the tensile and transverse strengths but also the modulus of rupture as a result of a simultaneous increase in the deflection values, according to G. Meyersberg[5].

Of practical significance is the fact that impact strength increases considerably. Charpy impact values on specimens 0.51 in. wide by 1.18 in. high are shown in table I.

The earlier investigations of the Aachen Giesserei-Institute, showed microstructures, figs. 3 and 4, of the fusion zones[6].

Fig. 5 shows the pouring arrangement in the first Aachen reinforcement tests. The results showed that one or two wires provided inadequate reinforcement, but three wires of high silicon (2.5 to 3.0 pct Si) steel substantially increased the strength and deflection.

It should be made clear that even in the case of good fusion, all values do not always improve at the same time. Extraneous influences involved in reinforcing cast iron are manifold and deviations in the cooling rate, the pouring temperature and other factors are to be expected. It is especially difficult to adjust the pouring temperature to the type of reinforced cast piece so that the optimum properties are obtained. If the pouring temperature is too low, the heat in the liquid cast iron is insufficient to heat the reinforcing material to the fusion temperature, and no fusion, or only insufficient fusion, occurs. If the pouring temperature is too high, some of the reinforcement material may be melted off and lost. Most important of all, however, is that it is not always easy to fix the reinforcing material in the right place in the mold. In this connec-



ABOVE

FIG. 5—Pouring arrangement for the production of the tensile bars. Inserts are held in position by being fused to the iron base plate prior to pouring.

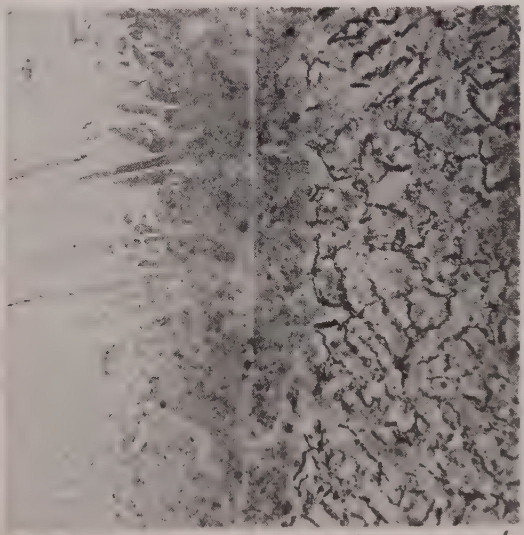
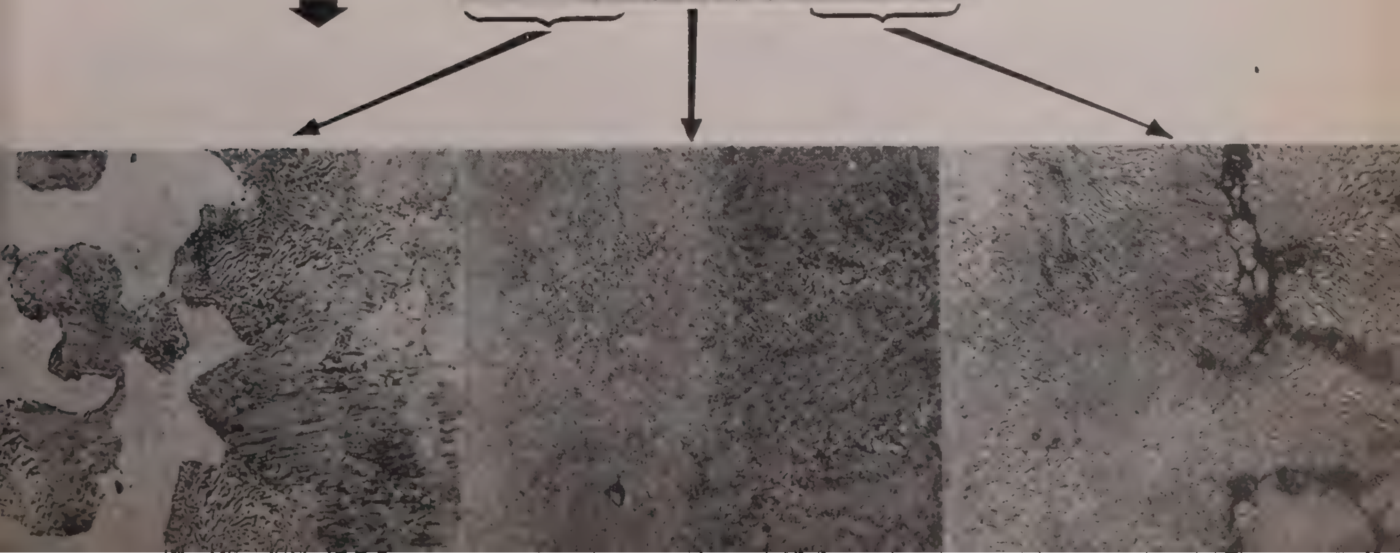


FIG. 4—Gray cast iron reinforced with a spring steel of 2.9 pct Si and 0.63 pct C. Note that there is no carbide network in the fusion zone. Single panel is 50X and the detailed sections 500X.



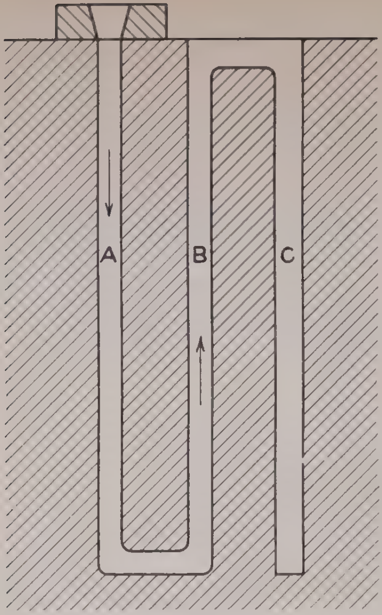


FIG. 6—Schematic drawing of pouring arrangement for reinforced castings. *A* is the drop funnel, *B* the test bar and C the overflow.

tion, a series of extensive tests were undertaken by the author together with F. L. Stuhlen at Maschinenfabrik & Eisengiesserei P. Stuhlen, Koln-Kalk.

Table II shows the results of these tests. The foundry used cupola cast iron of everyday commercial quality as a base material. Tensile strength and chemical composition differed on different pouring days, but did not vary much. The material contained 3.3 to 3.6 pct C, 1.8 to 2.5 pct Si and 0.6 to 0.9 pct P. Pouring temperatures below 2280°F always led to an abrupt decline in tensile strength, especially with more heavily reinforced castings, as shown in table III.

Different cooling rates after pouring made very little difference in the tensile strength. The tests showed further that a reinforcement exceeding 20 pct in relation to total cross-section is of no use because the increasing tendency toward formation of cavities and flaws gets out of control. Tinning or copper plating the reinforcing wire brought no advantage. Heating the inserts by means of electrical currents, which brought the inserts to red heat locally, was troublesome. It brought no improvement to the fusion and frequently caused a marked surface scaling of the inserts.

Flow-off of an extra amount of iron from the mold improved the fusion and gave the best results when pouring conditions were correctly balanced. Coating the inserts with a paste of water-glass and powdered 98 pct ferrosilicon gave good results occasionally. A treatment to obtain better adherence of the inserts was planned by siliconizing with $SiCl_4$, using nitrogen or hydrogen as carrier gas, in accordance with a process developed by F. Schmitz in Dusseldorf[7]. This work was abandoned during the years 1944 and 1945. As reinforcement material in the tests with F. L. Stuhlen, the materials in table IV were used:

The values for the reinforcement materials 1, 2, 4 and 5 correspond to those values observed after a 10-min annealing at 2190°F. In individual cases the round reinforcing wires were cold-rolled to a quadrangular shape. In this way the surfaces to be fused were increased. All test results in table II refer to dry sand casting. With green sand casting, dampness was always precipitated on the reinforcement material and led to flaws in the fusion. Fig. 6 shows the pouring arrangement finally selected for these tests.

Table II records results for 12 pouring days. The remaining values are covered in principle by the results summarized here.

Melting tests A to F in table II date from the beginning of the reinforcement investigation. It is seen that because of insufficient experience and defective fusion, little or no improvement in strength values resulted. In individual instances a decline in strength values was even observed.

The melts of tests G to L were also made early in the investigation, and the results, in general, confirmed the earlier work. A perfect 3 to 5 pct reinforcement yielded an increase of 8 to 41 pct in transverse strength, 3 to 44 pct for tensile strength and 0 to 77 pct for deflection. Test J shows the favorable influence of the flow-off. Test L shows the effect of increasing the percentage reinforcement.

In a subsequent issue, the author will present additional test data on reinforced cast iron specimens and give his conclusions on the techniques and advantages of this type reinforcement.—Ed.

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[1] Giesserei 25 (1938), p. 379.

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[4] Piwowarsky, E., D.R.P. No. 745 367, Klasse 18d, April 24, 1940.

[5] Meyersberg, G., Giesserei 17 (1930), p. 479 and 587; Stahl und Eisen 50 (1930), p. 1305; Piwowarsky, E., Hochwertiges Gusseisen, J. Springer, Berlin (1942), p. 429.

[6] Piwowarsky, E.: Gusseisen als Werkstoff. Giesserei, 30 (1943), p. 141.

[7] D.R.P. angem. Akt.-Zeichen; M 148 081, Klasse 48b (June 29, 1940); cf. Metals Progress, vol. 33, p. 367.

TABLE IV

Reinforcement Materials and Results

Material	Chemical Composition							
	C, pct	Si, pct	Mn, pct	P, pct	S, pct	Diam., in.	Tensile Strength, psi	Elongation, pct
1	0.04	0.32	0.71	Not determined		0.094	51,000	Not determined
2	0.01	0.28	0.64	Traces		0.161	97,000	Not determined
3		Wire Cable				0.098	Not determined	
4	0.06	4.36	0.04	0.007	0.017	0.205	64,000	10 to 14
5	0.63	2.98	0.95	Not determined		0.209	93,000-125,000	10 to 11
6	0.06	1.42	0.47	Monier iron		0.315	Not determined	

Some Notes on Fatigue Failures In Aircraft Parts

With fatigue failures in service occurring despite apparently good design and laboratory performance tests, there is still much unexplored ground in the realm of the nature of fatigue fractures. Some interesting notes covering a number of such failures in steel aircraft parts are contained in this article, with emphasis on probable causes.

○ ○ ○

By NORMAN E. WOLDMAN
Consulting Metallurgical Engineer,
Upper Montclair, N. J.

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IT HAS been said that failures in service occur in spite of good engineering design and laboratory performance tests. Actual stresses can, in general, be calculated and predetermined for normal operation of the part or unit, but peaks of higher stresses may often be encountered in service due to unforeseen or unknown conditions. Then again, stress-raisers in the rotating or moving part may set up the maximum stress far beyond the calculated fatigue strength of the material with subsequent rupture and failure. Sudden shocks or impacts encountered may cause early failure. Engineers are forced, as a result, to change design, change material, change section thicknesses or other dimensions, eliminate stress-raisers and take other steps to increase the life of the unit and to prevent failure.

Engineers in the aircraft industry are faced with many unknown and uncontrollable known factors in service operation. As a result greater

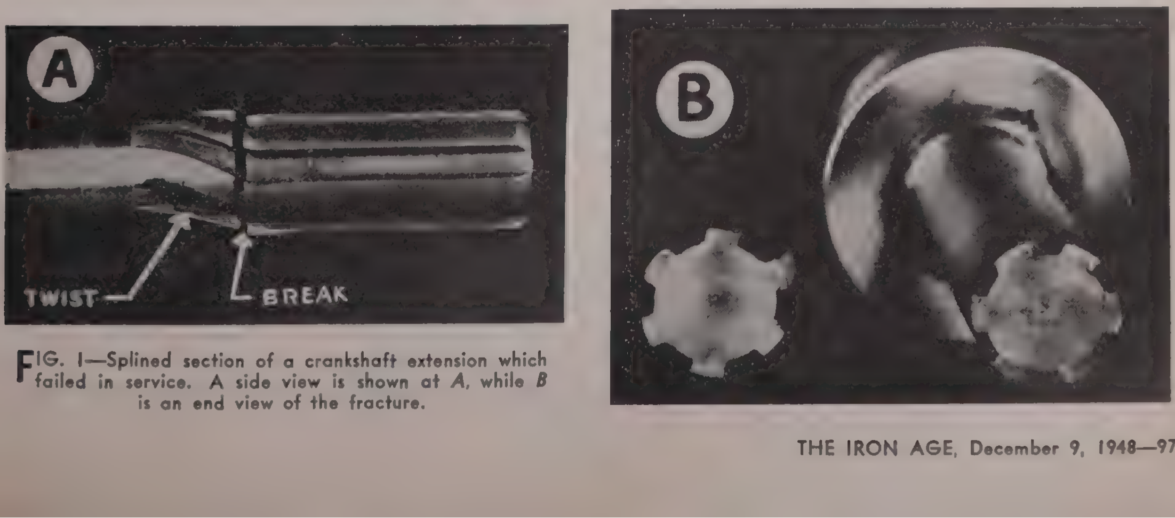


FIG. 1—Splined section of a crankshaft extension which failed in service. A side view is shown at *A*, while *B* is an end view of the fracture.

allowances and a greater factor of safety may have to be allowed in their designs. In aircraft installations, such as accessories attached to the engine, the parts are subjected to the engine vibrations, temperature changes in flight, and such elements of nature as wind, rain, ice and moisture condensation. Failures may be due to normal fatigue, bending fatigue, torsional fatigue, corrosion-fatigue, torsional impact, tensile impact and shear depending on the character and the magnitude of the stresses applied.

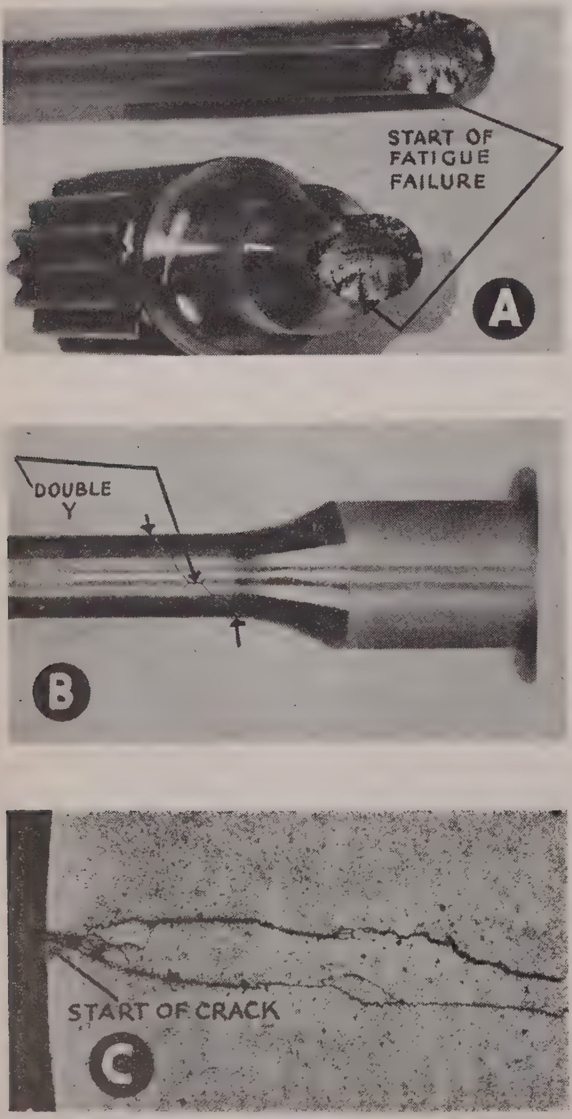


FIG. 2—Views of a generator drive shaft which failed in service. View *A* is the fractured parts showing a typical fatigue failure. *B* shows the section where the failure occurred. C is a cross-section at 100X of another double-Y that appeared on the shaft.

To assess the actual service reliability[1] that can be expected from a rotating or a rapidly moving component of a unit subject to shock and vibration, as in aircraft engines or accessories attached to the engine, the following two factors must be ascertained: (1) The magnitude of stress and variation with time, that is, the periodicity of the forces and moments to which the part is subjected during operation, and (2), the fatigue strength of the part or the range of the fluctuating forces and moments which the part is able to withstand through any number of cycles when applying in the testing machine stresses similar to those occurring in service.

Service failures[3] in rotating or reciprocating parts are usually caused by fatigue which develops from the continuous repetition of stresses. However, experience has shown that it is not calculated stresses which cause failure but rather high localized stresses. These may be the result of stress-raisers as fillets, shoulders, oil holes, tool or grinding marks, screw threads or rough surfaces, or they may be the result of such service conditions as misalignment, overload, inadequate support or even corrosion. Then again they may be the result of decarburized surfaces of steel which lower the fatigue strength or endurance limit of the material, or to the accidental bruising received in handling. Occasionally, more serious notches or stress-raisers are caused by defects in the metal itself, such as seams, excessive nonmetallic inclusion segregation, quenching cracks, grinding cracks and forging bursts or laps.

The useful fatigue strength of a material is largely limited by its resistance to various forms of stress-raisers rather than by its endurance limit under standard test conditions. Fatigue limits under standard conditions are quoted for many varieties of steel and other materials under varying conditions of heat treatment. The values represent the maximum load which a smooth, highly polished test specimen will endure without failure after a large number of repetitions of the load. Fatigue strength shown by such tests is not the only factor in determining the relative merit of different steels or other alloys. Stress concentrations due to discontinuities in cross-section or shape, as indicated previously, cause local increase in stress and contribute to fatigue.

DeForest[2] claimed that for engineering use, a fatigue figure of merit must be taken into consideration, that is, the resistance of the metal to the propagation of a crack due to a stress-raising condition. This property has come to be called notch-sensitivity. Quite evidently the moment a true fatigue crack has started at the bottom of a notch, the crack itself constitutes the greatest stress-raiser and the sharpest of all possible notches. There are, then, three figures bearing on the fatigue strength of metals: (1) The strength of the unnotched material; (2) the strength under a finite mechanical notch, and (3) the strength of the material to resist the progress of the natural fatigue crack, once this crack has started.

Destructive fracture in a metal part is always progressive, yet sometimes may be sudden, as in straight impact or torsional impact. Most cracks start at or very near the surface of the metal. After starting they spread either slowly or rapidly. In brittle materials the crack spreads very rapidly; yet in the case of fracture following long continued creep under a steady load the crack progresses very slowly. In true fatigue

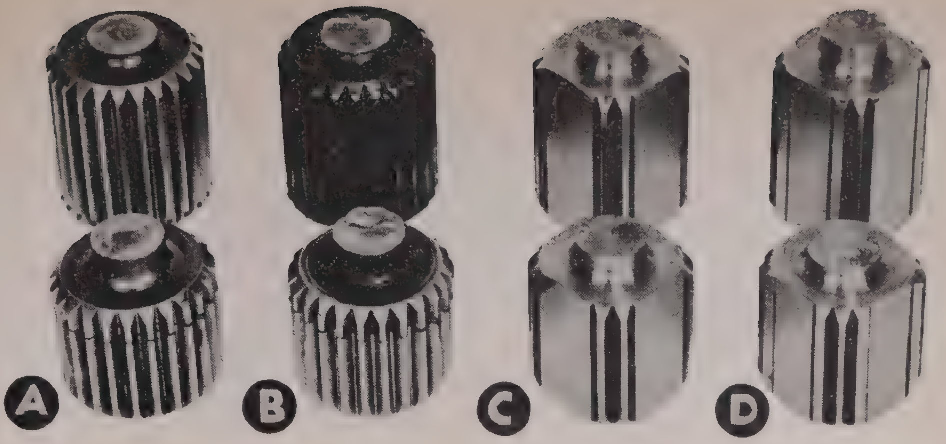


FIG. 3—Failures in spline couplings are illustrated here. Couplings *A* and *B* are service failures while *C* and *D* are laboratory test specimens for comparison.

fractures under repeated loading the cracks progress intermittently, and when the crack has spread far enough there follows a sudden rupture through the remaining uncracked metal in the crack-damaged cross-section. Evidence has indicated that under very rapidly applied load, failure of material may be of quite a different character from the failure under slow applied load.

Fatigue failures are estimated to comprise 90 pct of all service failures. These fractures are characterized by two distinct zones: (a) the fatigue failure proper, which is comparatively smooth, and (b) the final rupture which is rougher. The position of the final rupture is frequently taken as an indication of nonuniformity of grain size, segregation of impurities, or other defects in the metal. Actually, the position of the final rupture indicates stress conditions.

The material which will withstand the highest stress in repeated loading appears to be a heat treated alloy steel drawn for a very long time at as high a temperature as is compatible with retention of high strength in order to release internal energy. This gives maximum endurance limit by eliminating stress concentrations due to hardening. The steel must also be of a clean quality, free from seams and impurities.

In general, in static failure, one or all of the following forces will be found acting on a part: Tension, compression, shear, torsion and bending. Torsion is a pure shearing force, bending is a combination of shear and tension or compression, while tension and compression are identical but opposite in sign. Thus a complicated system of forces acting upon a body can usually be interpreted in terms of two stresses: (1) tension and (2) shear.

Case 1—Failure of Crankshaft Extension:—Fig. 1a shows the twist and break in the splined section of a crankshaft extension which failed in service. The shaft was made from a high Ni-Cr steel analyzing 0.55 C, 0.54 Mn, 3.77 Ni, and 1.05 Cr. It had been oil quenched and tempered to 34 to 35 Rc. The shaft twisted about 30° in the splined end of the shaft before final rupture occurred. Fig. 1b shows the appearance of the fractured surfaces. No typical fatigue markings were visible. The surface was very smooth and was indicative of typical torsional shear.

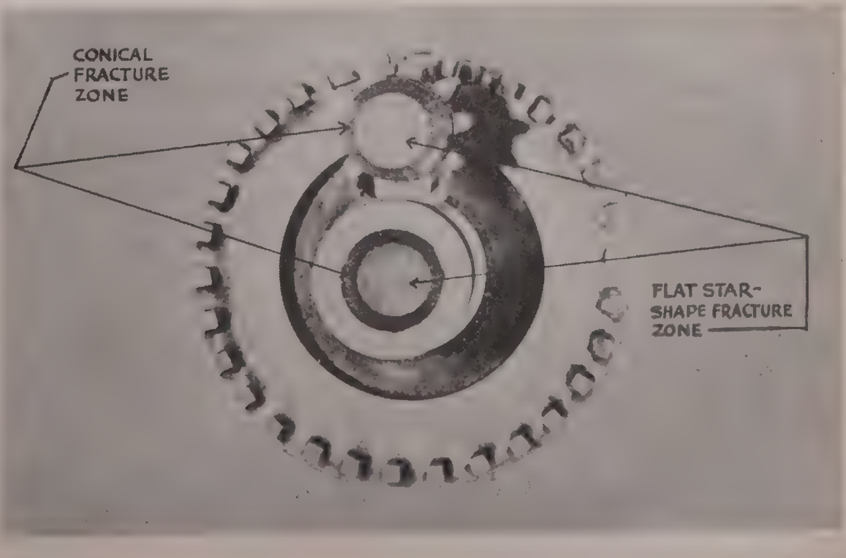
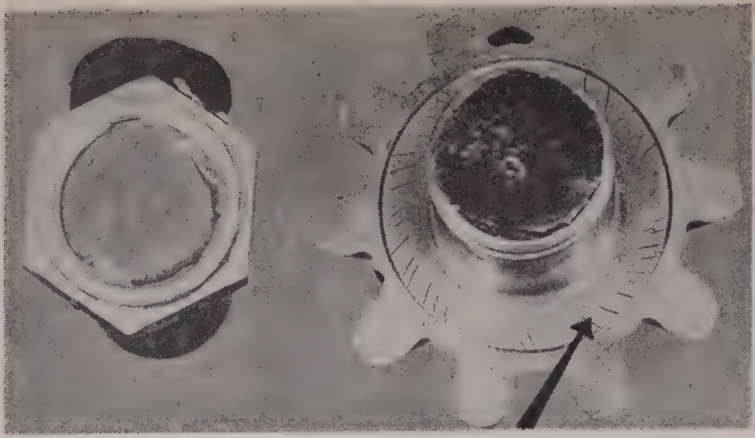


FIG. 4—Fractured ends of a rotor shaft which failed in service.



LEFT

FIG. 5—Fractured surfaces of two halves of a geared crankshaft. The fracture was flush with the castellated nut. Arrow indicates grinding cracks located by Magnaflux inspection.

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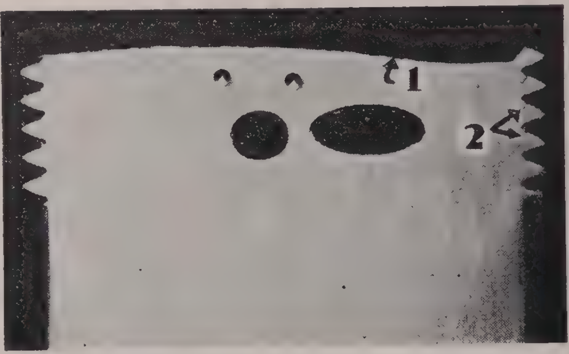
BELOW

FIG. 6—Longitudinal section (6X) through the crankshaft (fig. 5) showing fracture and cracks in threads. (1) is the fracture line; (2) is the cracked threads.



Case 2—Failure of Generator Drive Shaft:—Fig. 2a shows a generator drive shaft which failed in service. The shaft was made from a hammer forged Ni-Cr-Mo steel bar analyzing 0.48 C, 1.74 Ni, 1.09 Cr, and 0.28 Mo. It was oil quenched and tempered with a long draw to 32 to 36 Rc, and the splined drive-end rehardened to 48 to 52 Rc. Failure occurred in the small diameter adjacent to the splined drive-end. A crack was observed on the surface of the shaft at the fracture, going off in a 30° angle from the direction of fracture.

Other minute cracks of double-Y formation were visible at various points of the shaft after Magnafluxing as shown in fig. 2b. The fracture indicated typical fatigue starting from a nonmetallic inclusion as the focal point. The double-Y cracks originated from these inclusions. Fig. 2c shows at 100x the cross-section of a double-Y which appeared on the shaft. The depths of the cracks are clearly seen.

Failure was due to repeated stresses developing fatigue cracks in the area of the inclusions during operation. Such failures frequently occur when the generator is operating near resonance.

Case 3—Failure of Splined Couplings:—Fig. 3 shows, at the left, two splined couplings (*A* and *B*) which failed in service. They were made from SAE 3135 nickel-chromium steel hardened all over to 32 to 36 Rc and the splined ends further induction hardened to 44 to 50 Rc. The shear section had a hardness of about 35 Rc.

Coupling *A* showed torsion impact fracture, a smooth flat sheared surface perpendicular to the axis. There was a 22° twist in the shear section, indicative of repeated torsional impact loading. Coupling *B* showed typical torsion fatigue failure, probably resulting from eccentric loading or misalignment after bearing failure. It showed an uneven break with clearly defined rings concentric about a point on the fractured surface. The shear section showed no twist. Specimens *C* and *D* are laboratory test specimens showing typical static torsion fractures for comparative purposes.

In simple torsion a small rosette remains on the sheared face at the last spot to rupture. With torsion impact the sheared face is smooth and no rosette remains. Both laboratory test specimens showed a slightly roughened series of rings concentric about the last point to fail.

Case 4—Rotor Shaft Failure:—Fig. 4 shows the fractured ends of a rotor shaft which failed in service. The shaft, having a spur pinion at one end, was made of SAE 3250 steel, analyzing 0.47 pct C, 1.65 pct Ni and 1.05 Cr. It was heat treated by hardening all over in oil to 28 to 32 Rc and the pinion end further induction hardened to 48 to 52 Rc for a length of 7/8 in. from the end of the shaft. Rupture occurred through the undercut below the pinion and the failure was characterized by a distinct cup and cone fracture. Slight feathering was observed at the tooth top of several pinion teeth.

This part failed in fatigue. Apparently a radial component of tooth load acting on the pinion perpendicular to the shaft axis made the overhung pinion act as a rotating cantilever beam as the shaft rotated. This caused a cyclic stress in the undercut below the pinion and resulted in the fatigue failure. After this initial failure progressed through the shaft to the bottom of the cone, the remaining shaft diameter was too small to transmit the driving load and the flat fractured zone at the bottom of the cup resulted. This zone failed in torsion.

Case 5—Fractured Crankshaft:—Fig. 5 shows the fractured surfaces of the two halves of a geared crankshaft which ruptured on a production test. The fracture was flush with the castellated nut. The shaft was made from SAE 3250 steel analyzing 0.46 pct C, 1.76 pct Ni, 0.94 pct Cr. It was oil hardened to 47 to 48 Rc, then cadmium plated all over.

Magnaflux tests showed grinding cracks on the flat face of the bevel gear, as shown in fig. 5, and circumferential cracks in some of the threads beneath the nut as seen in fig. 6. The cracks in the threads were found on one side only and covered a half to two-thirds of the circumference. They were not present at the root of the thread, but at approximately a third of the distance between the root and the top.

The fracture started as a crack in one of the threads, propagated part way through the thread, then changed its course to proceed across the shaft diameter.

Evidence showed misalignment of parts in assembly when the nut was tightened. One side of the contact surface of the nut with the bearing was deeply scored from tightening. This scoring was in line with the circumferential cracks in the threads and was on the side where rupture started.

Case 6—Broken Planetary Spider:—Fig. 7 shows a broken planetary spider where one tooth had broken out while on performance test. The part was made from upset forged nickel-chromium-molybdenum steel, analyzing 0.42 pct C, 1.83 pct Ni, 1.09 pct Cr and 0.16 pct Mo. It was oil hardened to 48 to 50 Rc. Marked pitting had occurred on one side of all the teeth of the gear. Metal flow had occurred in which the involute of the teeth had been distorted and feathering occurred over the top of the teeth. Fig. 8, at 7X, shows this profile distortion and feathering in a cross-section cut through the gear.

Magnaflux test showed cracks at the tooth root on both sides of several teeth, as shown in fig. 9. There were also marked evidences of pits and minute cracks below the pitch line of the teeth which did not rupture. Final fracture, however, started in fatigue at the root of the tooth on the driving side of the gear.

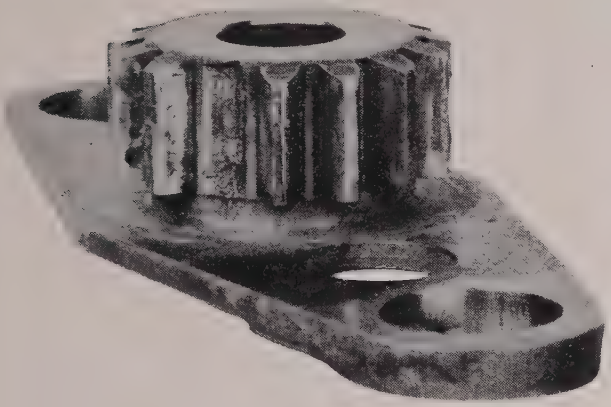
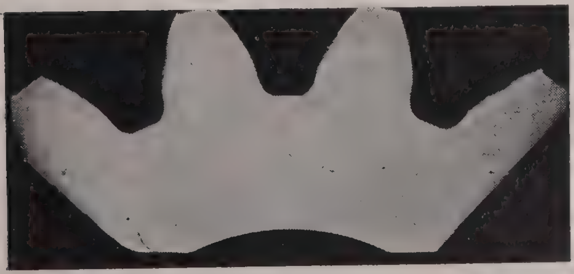


FIG. 7—Planet spider showing broken tooth and pits on other teeth.



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[2] A. DeForest, "The Rate of Growth of Fatigue Cracks," J. Applied Mechanics, A-25, 1935.

[3] H. F. Moore, "How and When Does a Fatigue Crack Start," Metals and Alloys, November 1936.

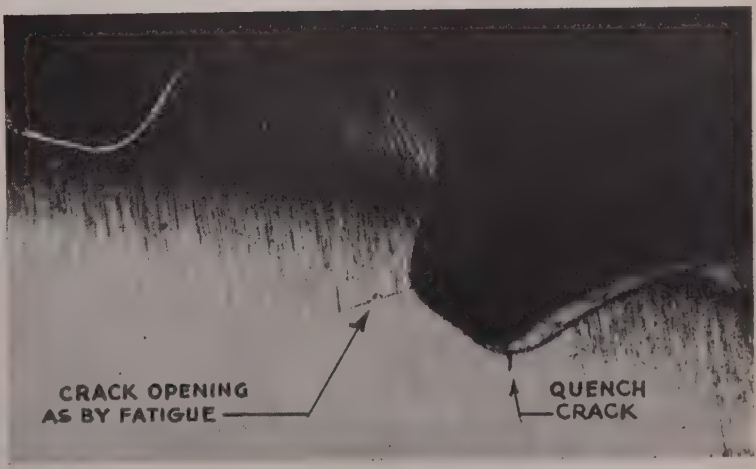
ABOVE

FIG. 8—Cross-section (7X) of gear in fig. 7 showing distortion at pitch line and at tip of teeth.

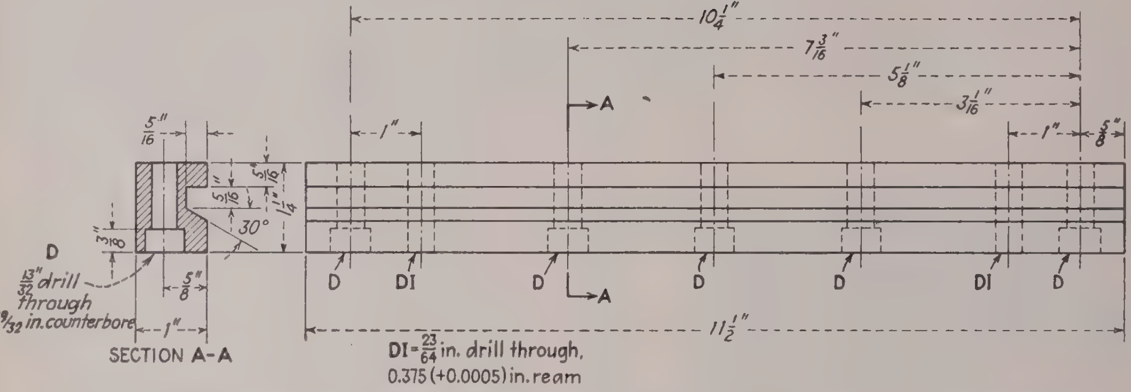
o o o

RIGHT

FIG. 9—Cross-section (18X) through the teeth of the gear in fig. 7. Magnaflux indications show cracks at roots of teeth. At right is a quench crack; the crack at the left, probably a quench crack, had become deeper in service.

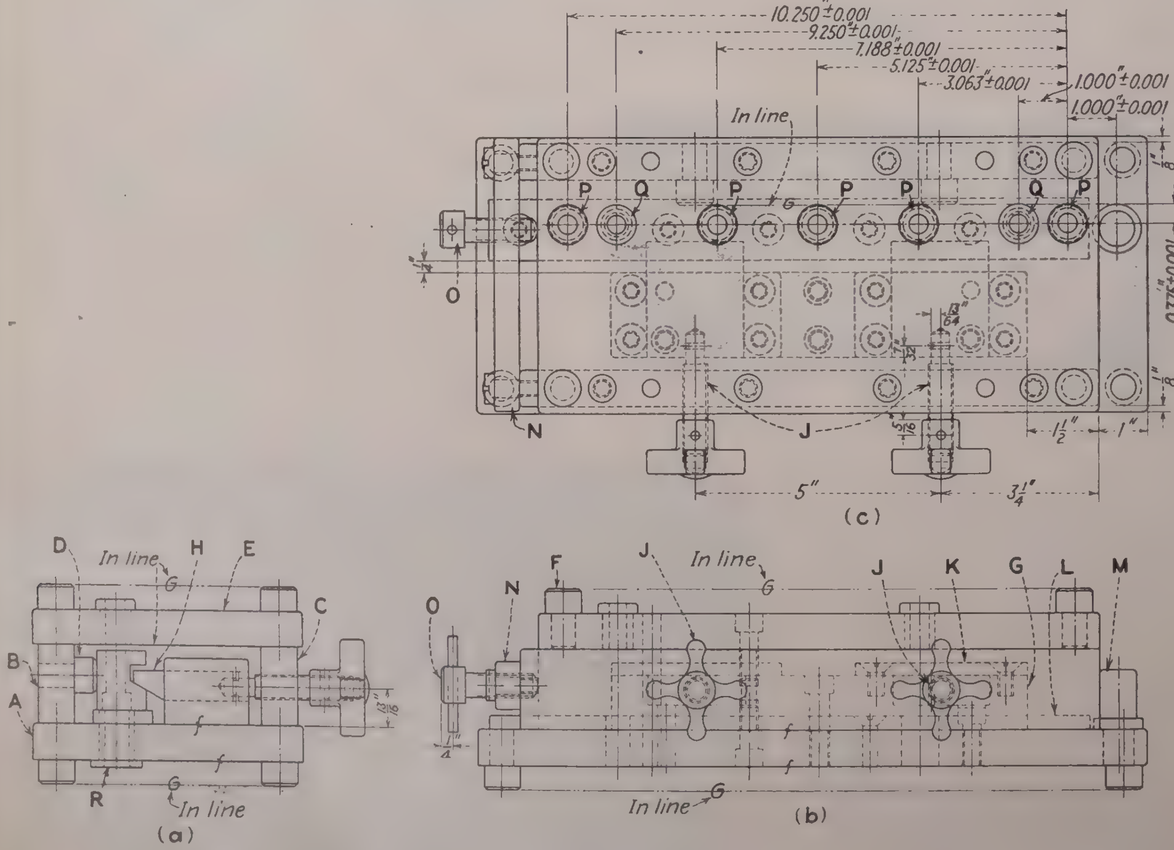


Jig for Accurate



10 1/4"
7 3/16"
5 5/8"
3 1/16"
1"
5/8"
A
SECTION A-A
5/16"
5/16"
5/16"
1 1/4"
3/16"
30°
5/8"
1"
D
13/32" drill through
19/32 in. counterbore
D
DI
11 1/2"
DI = 23/64 in. drill through, 0.375 (+0.0005) in. ream

FIG. 1—Two 23/64 in. holes and five 13/32 in. holes counterbored to 19/32 in. are required in this machine tool part. Made from SAE 1020 cold rolled steel, the part is 11½ in. long, 1 in. wide, and 1¼ in. high, and is grooved lengthwise before drilling.



10.250" ± 0.001
9.250" ± 0.001
7.188" ± 0.001
5.125" ± 0.001
3.063" ± 0.001
1.000" ± 0.001
1.000" ± 0.001
In line
P
Q
G
O
13/64"
0.375" ± 0.001
1/8"
1/8"
N
J
5/16"
1 1/2"
1"
5"
3 1/4"
(c)
D
In line
H
E
G
C
B
A
13/16"
f
R
In line
(a)
O
N
F
J
In line
J
K
G
L
M
In line
(b)

FIG. 2—For extreme accuracy in hole locating, a jig, details of which are shown here, was developed for positioning and holding the part. Three adjustments, easily and quickly made, set the jig for use.

Part Duplication

By ROBERT MAWSON
Providence

Accurate part duplication is facilitated by production jig and fixture design. In drilling motor plate keys for one of its milling machines, Van Norman Co. uses the jig described in this article for accurate location and positive holding.

WITH the precision machining required on components used in most mechanical products, it is necessary that the machine tools producing these parts be also made with similar high grade manufacturing procedures. If these machine tools are built inaccurately the parts produced by the machines will not be interchangeable. Further, a customer requiring repair parts for machine tools expects to apply these details without fitting them to the machines. In a word, repair parts must be interchangeable with the details they replace.

A good example of accurate part duplication is in the production of a motor plate key used on the No. 16 milling machine built by the Van Norman Co., Springfield, Mass. The part is one in which seven holes must be carefully spaced in relation to each other and to the dimensions of the part. This is accomplished by means of a drilling jib that positions and holds the part during two drilling and one counterboring operations, which are performed from opposite faces of the jig.

Fig. 1 shows the motor plate key details. The part is made from SAE 1020 cold-rolled steel bar stock. The first operation involves cutting the bar to length and machining the slot *B* in its length. After this slot has been machined into the part, the drilling operations are performed. Drilling consists of five 13/32 in. holes, D in fig. 1, through the workpiece which are counterbored to 19/32 in. to a depth of ⅜ in., and two 23/64 in. holes through the section, DI in fig. 1.

The drill jig details used in drilling and counterboring these holes are shown in fig. 2. This jig is made with a machine steel base, *A* finished on the top and bottom faces. A machine steel height block, *B* machined on its upper and lower surfaces is fastened to the base with four socket head screws and two dowel pins. Another height block *C*, machined on its upper and lower faces, is fastened to the opposite side of the base by means of four socket head screws and two close fitting dowel pins.

In the height block *B* are driven two tool steel, shouldered locating pins, *D*. On the upper surfaces of the height blocks is fastened, with eight socket head screws and four dowel pins, a plate, *E*, both faces of which are finish machined. In each of the jig details (base *A* and plate *E*) are driven four tool steel rest pins, *F*, which are then ground on their outside faces to be in parallel planes.

To the jig base is fastened, with four socket screws and two dowel pins, the locating wedge guide-block *G*, in which have been machined and ground two slots. The pack hardened and ground steel locating wedges, *H*, slide in this wedge guide-block. In the height block *C* are drilled and tapped two holes to suit the screws *J*, which are attached on their inner ends, by means of a pin, to the locating wedges, *H*. At the outer ends of the screws is fastened a malleable iron knob, providing a convenient medium for moving the screw and the locating wedge.

On the block *G* and extending over the upper face of each locating wedge is fastened, with four flat head screws, a steel plate. On the jig base is fastened, with five flat head screws, a ground tool steel workpiece-height locating plate *L*. The workpiece is located in the drill jig lengthwise with the tool steel, hardened and ground, pin *M*.

At the forward or left-hand end of the jig is placed a steel strap, *N*, that swings over shouldered screws, threaded into the height blocks *B* and *C*. One of the holes in the strap, through which the screw passes, is slotted to enable the strap to swing back without removing the screw from the height block. Threaded into the strap *N* and in line with the center of the workpiece is a screw *O* made with an enlarged portion through which is driven a steel pin to provide a convenient medium for moving the screw.

In the plate *E* are accurately placed five hardened tool steel bushings *P* to guide the drill when drilling the 13/32 in. holes. Also in the plate at *Q* are positioned two hardened tool steel drill guide bushings for the 23/64 in. holes. In line with the bushings, *P*, and in the jig base are placed five hardened tool steel bushings *R* with a 19/32 in. ground hole to guide the counterbore used in the holes that were drilled through the bushings *P*.

To use the jig, the strap *N* is first moved back from the opening in the end of the jig. One of the keys to be machined is then placed into the jig through the opening made by swinging back the strap. The workpiece is inserted into the jig until its end comes into contact with the locating pin *M*. The strap, *N*, is swung back to its former position, which closes the opening in the jig, and the screw *O* is tightened against the end of the workpiece to keep it in contact with the locating pin *M*.

The two screws, *J*, are tightened to bring into action the locating wedges *H*. Their angles, coming in contact with the angle machined in the workpiece, not only hold it against the bottom plate *L*, but also force the part back to the locating pins *D*. The workpiece is thus accurately located and held securely for the machining operations.

With the drill jig on the machine table in the position shown in the top drawing in fig. 2, five 13/32 in. and two 23/64 in. holes are drilled in the workpiece, the drills being guided through the bushings in the plate *E*. The drill jig is then turned over so pins *F* rest on the table of the drill press. With the drill jig in this position the five 13/32 in. drilled holes are counterbored to 19/32 in. to a depth of 3/8 in., the tool being guided in the bushings *R* and provided with a stop collar to determine the proper depth in the conventional manner.

To remove the finish machined workpiece the drill jig is turned over to its original position, the screw *O* is moved back to enable the strap *N* to be swung back, and the two screws, *J*, are moved out with the knobs, removing pressure from the angle of the workpiece. The workpiece is slid out of the jig through the open end.

This well-designed drill jig locates the workpiece accurately, it also holds the piece positively, the locating and holding work is performed with simple and quick operating features so that the drilling and counterboring operations are done at a low production cost.

Mill-Broach Speeds V-8 Engine Production

BOTH milling and broaching in machining automotive cylinder blocks and heads offer certain advantages. A new approach to the problem has been made by Cincinnati Milling Machine Co., Cincinnati. During the roughing operation, advantage is taken of the ability of milling cutters to get under the scale without excessive tooth wear. For finishing, approximately 0.020 in. is removed by broaching, producing the dimensional accuracy and quality of surface finish required.

The new machine has several unusual features. The sketch, fig. 1, illustrates how the top, side, parting, and manifold surfaces of a V-8 cylinder head are roughed out by milling and finished by broaching in one continuous cycle. The cycle is automatic and production averages about 40 completed cylinder heads per hour. The actual work performed by the machine consists of 160 milled and broached surfaces. By referring to the sketch it will be seen that two spindle carriers, each driving two milling cutters and two sets of broach inserts, are mounted on a ram that moves longitudinally along the bed past the work stations. Each work station has a hydraulically operated hinged-type work holding fixture. Between the stations is a roll-over fixture that turns the casting 180° between the first and

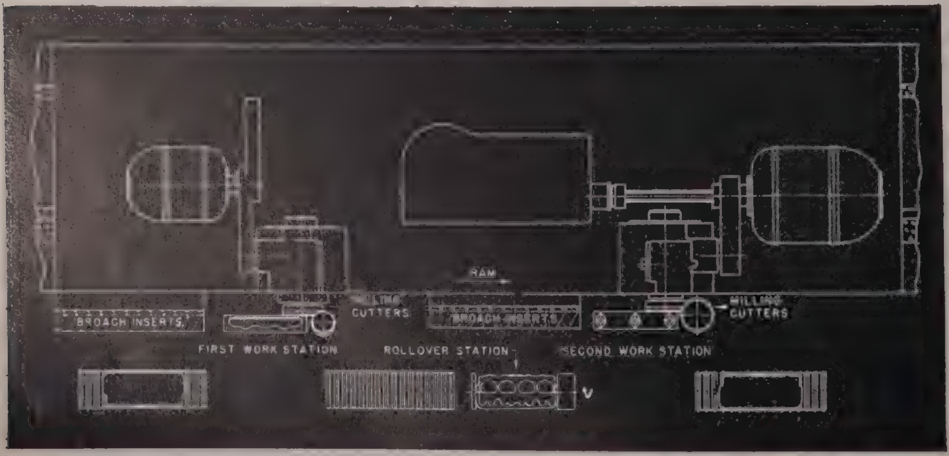


FIG. 1 — Relative positions of the ram, milling cutters, broaching tools, and work holding fixtures are shown here.

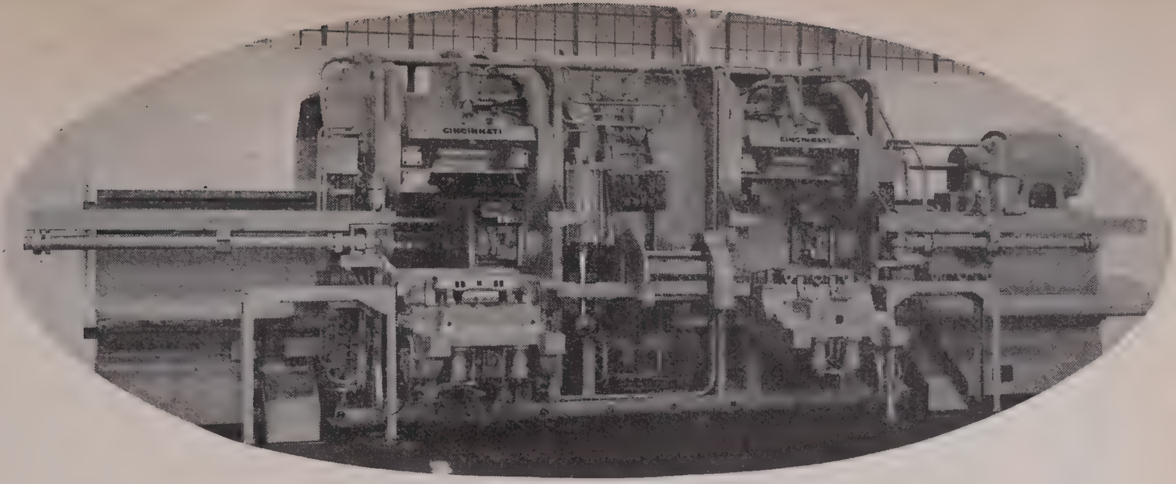


FIG. 2—The new mill-broach combines milling and broaching to finish cylinder heads in one continuous cycle.

second operations. The machine itself is shown in fig. 2.

The cutting cycle is simple. Two milling cutters at the first station, fig. 3, rough the top and side surface of one casting and, simultaneously, two milling cutters similarly arranged at the second station rough the manifold and parting surfaces on a casting transferred from station No. 1. At the completion of this half of the cycle, the ram speed changes from a milling feed of 40 ipm to a cutting speed of 40 fpm to finish the job by broaching. Full support is provided for the broach holders, but there is no non-productive overtravel of the ram since it is stopped by an automatic brake as soon as the cutting cycle is completed. The broach inserts are high speed steel, but carbide tipped milling cutters with 75° corner angles are used. This type of cutter does not cause a break out on the edges of the work which so often occurs when heavy feeds are applied.

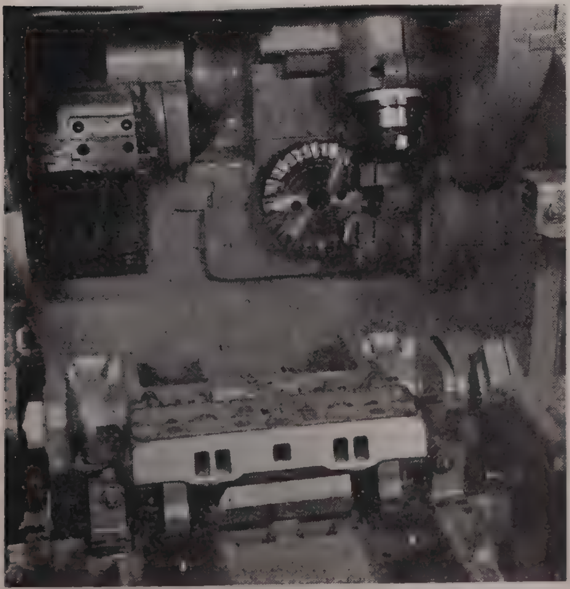


FIG. 3—Top and side surfaces are roughed and finished in station No. 1.

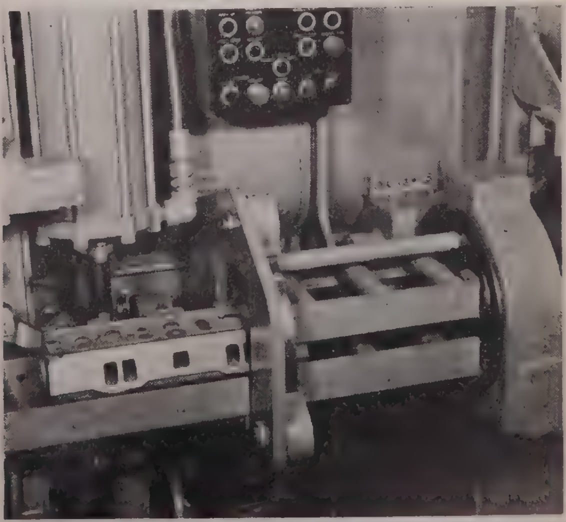
At the end of the cutting cycle, the hinged-type work holding fixtures are lowered and the hydraulically-operated transfer mechanism moves the castings on a roller type conveyer table, located across the front of the machine, and positions them in the next fixture where they are held by hydraulically-operated clamps. While this is being accomplished, the ram returns to its starting position and the casting from station No. 1 is turned 180° by the "roll over" fixture, fig. 4.

Each unit may be individually operated in setting up the machine. Interlocks of all electrical and hydraulic controls are provided to safeguard the machine, tools, work, and operator.

By combining the advantages of both milling and broaching; by obtaining economy through mechanical work handling; and by devising a completely automatic cycle with no idle time, the economies of the machining operation are obvious.

BELOW

FIG. 4—Roll-over fixture turns casting 180° between first and second operations.



Machining High Purity

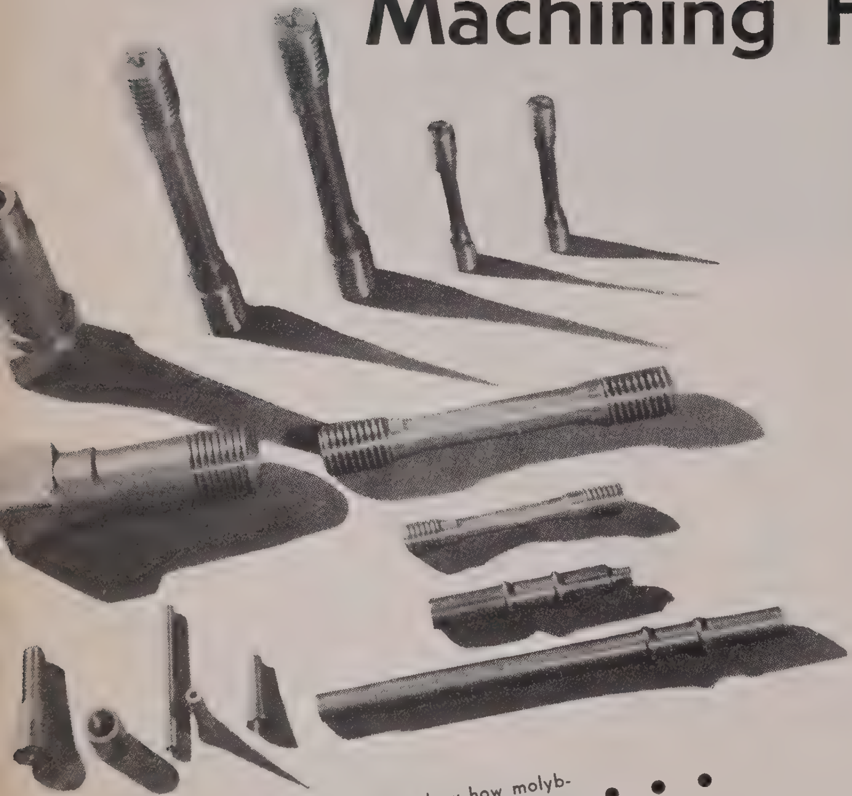


FIG. 1—In addition to the test bars which show how molybdenum can be turned and threaded, there are shown some typical parts being regularly made from this material.

By JOHN GELOK
Manager, Lamp and Tube Parts,
Westinghouse Electric Corp.,
Bloomfield, N. J.

• • •

WITH the development of techniques for making molybdenum ingots ranging in weight up to 250 lb, as against a maximum ingot weight prior to World War II of 8 to 10 lb, it became necessary to develop methods whereby this material could be formed, shaped and cut. The chief use of molybdenum in the past has been in incandescent lamps as supports for the filaments lead-in wires and mandrel wire on which the tungsten filament is wound. For these uses, the amount of molybdenum required was relatively small and the parts themselves were quite small.

TABLE I

Carbide Grades of Westinghouse WA Standard, Suitable for Continuous Cuts in Turning Molybdenum

(Numbers in brackets are arbitrary Westinghouse identification for codes on tools)

Producer	Brand
Adams Carbide Corp. (6)	A
Allegheny-Ludlum Steel Corp. (9)	CA4
Carboloy Co., Inc. (2)	883
Firth Sterling Steel & Carbide Corp. (1)	HAX
Jessop Steel Corp. (5)	MF
Kennametal, Inc. (3)	K6
Metal Carbide Corp. (7)	C-91
Tungsten Electric Corp. (8)	A1
Vascoloy Ramet Corp. (4)	2A5
Wesson Co. (10)	G1
Willey Carbide Tool Co. (11)	E6

The increased demand for more and larger pieces of electronic equipment brought a demand for more complex and larger shapes to be made from molybdenum. The high melting point of molybdenum, 4750°F, and high hardness, 150 to 250 Bhn, made normal methods of reduction, melting, casting, rolling, drawing and machining impractical and inadequate. As the quantity of molybdenum became greater and methods of forming it were developed, the demand for the material started to spread from the electronic tube and incandescent lamp industries. The glass industry is an increasingly greater consumer of molybdenum sheet, plate, bolts and studs for electrodes. Aircraft test specimens have been made of molybdenum, and molybdenum electrode collet caps for Heliarc welders are in use. Experimental parts have been made for the petroleum industry. Also, intricate dies have been made and are being tried by the diecasting industry. Sample machined parts are shown in fig. 1.

Considerable investigative work has gone into the machining of molybdenum by Westinghouse Electric Corp., in order that it might be of greater service to the metalworking industry as well as be more broadly applied by Westinghouse. The investigative work has resulted in some rec-

Molybdenum

Coming into greater demand because of its availability in larger pieces, molybdenum is being used for such products as bolts, nuts, studs, welder collet caps, tubing and electrode holders. Because of its inherent characteristics, some unusual problems are faced in machining, forming and joining this metal. Some recommended machining practices are outlined in this article, and results of investigations of various welding methods are described in a subsequent article.

ommended practices, which, while always subject to change and modification, serve as the basis for accurately machining the metal in production volume.

For inside and outside turning, the preferred tool is a modified lead angle tool, designated in the Westinghouse standards manual as style 108. This is a carbide tipped tool, originally designed for machining cast iron and nonferrous metals. Details of this particular type tool are shown in fig. 2. The Westinghouse style 108 tool is an industry standard style, BL, and the grade designation, WA, is a Westinghouse internal specification based on data supplied by manufacturers of such tools and the experience of the company's operating divisions. Carbides marketed by typical manufacturers that meet this WA standard are shown in table I.

Any of the standard general purpose tools commonly used for turning cast iron, but altered in design, can be used for cutting molybdenum. The largest shank size that can be adapted to the lathe being used is recommended for tool rigidity. This is illustrated in fig. 3. The alteration to the standard tool that is recommended by Westinghouse for turning molybdenum is: top rake, 6°; clearance angles, 7°; and nose radius, 1/64 in. for all size tools.

Machining speeds and feeds are likewise important in turning molybdenum, because optimum cutting requires certain speeds. Experience has indicated that the feeds and speeds, using the recommended tools, should be those shown in table II.

In inside and outside turning of molybdenum, it is important that the depth of cut be greater than 0.002 in., as depths from 0.0005 to 0.002 in. abrade the nose radius of the tool so rapidly that it is soon worthless. Another point of importance is to assure that an adequate supply of coolant, from 2 to 6 gpm, be directed at the point of the cut. This prevents excessive heating of the work and the tool. Also, it removes the abrasive-like material that is produced, in addition to the chips, when machining molybdenum. This dust-sized material, if not removed, abrades the cutting edge of the tool.

While carbide tipped tools are specified, it is possible to machine molybdenum with high speed tools if the cutting speeds used do not exceed about 20 pct of those specified for carbides. The use of cast alloy tools has not proved successful because of their apparent inability to resist the high abrasive action of molybdenum at the cutting edge.

No method of milling molybdenum with high

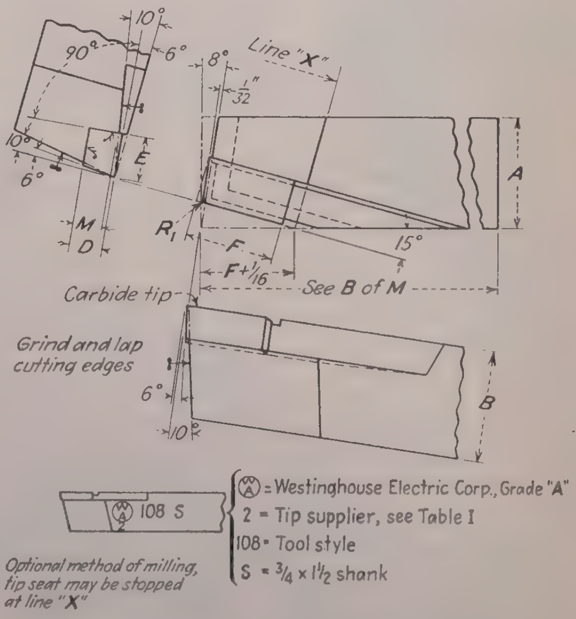

10°
90°
6°
8°
Line "X"
1/32"
10°
6°
E
A
M
D
R1
F
15°
F+1/16
See B of M
Carbide tip
Grind and lap cutting edges
6°
10°
B
WA 108 S
2
WA = Westinghouse Electric Corp., Grade "A"
2 = Tip supplier, see Table I
108 = Tool style
S = 3/4 x 1 1/2 shank
Optional method of milling, tip seat may be stopped at line "X"

FIG. 2—A general purpose tool used for cast iron but altered in design can be used for turning molybdenum. Shown here is the standard tool, and the modifications are described in the text.

TABLE II

Machining Data on Molybdenum

	Speed, Fpm	Feed, In.	Depth of Cut, In.	Coolant
Turning				
Roughing	200	0.015	Up to 1/8	Royal Blue Cut, 15:1
Finishing	400 to 500	0.006	0.003 to 0.015	Royal Blue Cut, 15:1
Milling				
Rough	110 to 130	0.005 in. per tooth chip load	Up to 0.050	Royal Blue Cut, 5:1
Finish	350 to 400	0.005 in. per tooth chip load	0.003 to 0.015	Royal Blue Cut, 5:1
Drilling				
HSS	30 to 35	0.003		Royal Blue Cut, 5:1
Deep Drilling				
Carbide	40 to 45	0.003		Royal Blue Cut, 5:1
Shaping	Ram speed, 26	Hand feed 0.004 to 0.007	1/16	

speed tools with any reasonable tool life has been discovered, but excellent results have been obtained using carbide tipped cutters. Here again, the use of a carbide equal to the Westinghouse grade WA has proved satisfactory. Such an operation is shown in fig. 4.

For slab milling, a 4-in. diam cutter, tipped with carbide teeth on a 15° spiral and a 3° positive face angle performs well. It is not believed that such a cutter represents the best possible design, since both a steeper spiral and a greater face angle would be desirable.

Because a 4-in. diam by 6-in. long cutter costs $400 and because manufacturing difficulties involved in producing such a tool have limited experimentation on modified cutters, the cutter described is the best used to date. Good results have been possible with the described cutter used at the feeds, speeds and depths of cuts shown in table II.

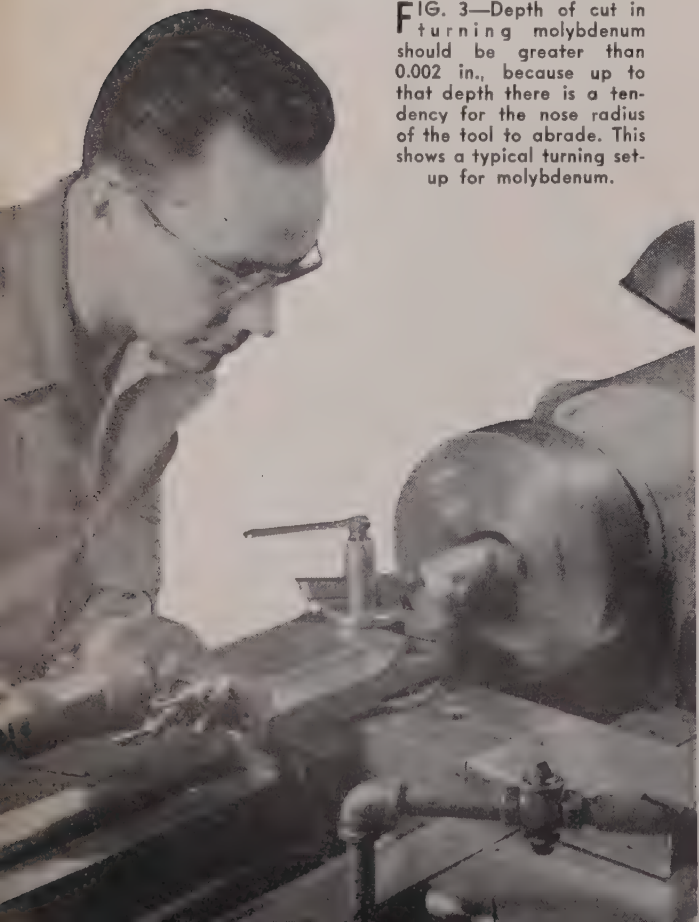


FIG. 3—Depth of cut in turning molybdenum should be greater than 0.002 in., because up to that depth there is a tendency for the nose radius of the tool to abrade. This shows a typical turning setup for molybdenum.

Face milling has been successfully done using the conventional carbide tipped face mills of the design normally used for cast iron. The helix angle of such a cutter is about 12° to 15° positive, and the radial angle is from 6° to 10° positive. If the finished surface permits a 15° to 20° lead angle or 45°x1/16-in. chamfer, or both, is desirable. Face milling is done under the roughing and finishing conditions outlined in table II.

Carbide tipped, two-lip drills are best for drilling molybdenum, but the use of these drills requires cored or lead holes to be made before the drill can be used. If the hole is cored, a lead hole can be made with a single point boring tool, using the technique outlined under turning. If no cored hole is available, it is necessary to use a high speed drill and regrind it as often as necessary to produce the lead holes.

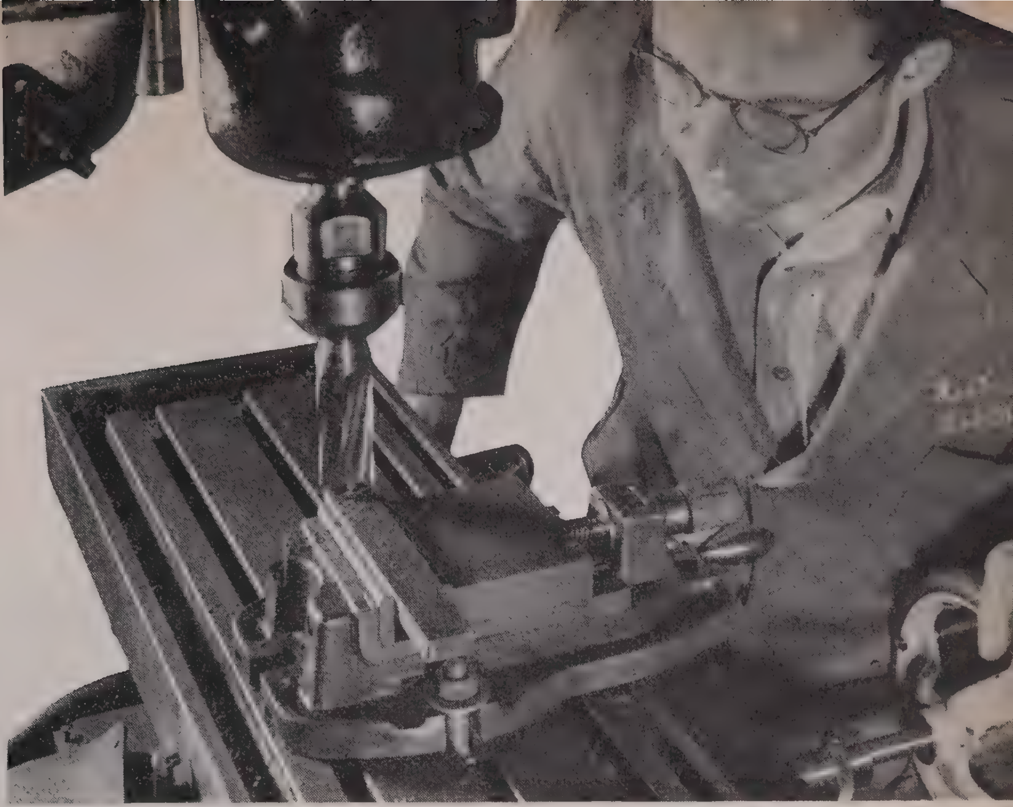
For this operation, a standard high speed steel twist drill used at 30 to 35 fpm and at a feed of 0.003 in. per revolution is satisfactory. A strong stream of Royal Blue Cut coolant at a 5:1 mixture is used, and care must be exercised to place the nozzle so as to force the coolant down into the drill flutes as much as possible.

In deep drilling, two-lipped carbide drills are recommended. The cutting edges are carbide tipped and two rows of four carbide wear strips are located at 90° intervals. Both the cutting edges and the wear strips should be carbide equal to Westinghouse grade WA. In using this drill, the speed should be from 42 to 45 fpm at a feed of 0.003 in. per revolution. Royal Blue Cut, in a 5:1 mixture, has worked well as a coolant for the cutting edges and as a lubricant between the wear strips and the molybdenum.

In deep drilling, the method of using the cutting fluid is important. It must be pumped down the drill shank and through drilled holes so spaced as to place the stream of fluid directly on the cutting edge. In addition, the pressure must be sufficient to wash all chips and abrasive particles out of the hole, ahead of the drill. A pressure of 200 psi has been found to work well for this purpose.

No difficulty has been experienced in machining molybdenum on a shaper although little work has

FIG. 4 — Milling with high speed steels has not been satisfactory, but excellent results have been obtained with carbide tools.



been done by this method. Excellent results have been obtained at a ram speed of 26 fpm, a hand feed of about 0.004 to 0.007 in. per stroke, and a depth of cut up to 1/16 in. Commonly used hand-ground, high speed steel tools work well, although the moly type of high speed steels seems preferable to the 18-4-1 type. A generous back rake of about 15° seems to perform best.

The major difficulty in machining molybdenum appears to be the tendency of the work to flake off on the side toward which the feed is progressing as the cut nears completion. This is serious, as the chipped areas may be as large as ¼ in. across and 1/32 in. deep. This ruins any finished edge.

To avoid this condition, two techniques are used. First, the cut can be started and run in one direction to about the center of the cut. Then the work can be moved and the cut picked up on the opposite of the work and the tool fed in the opposite direction to the feed cut. This will complete the cut on a central surface where no chipping is possible. The second method is to use a very fine feed with a broad or round-nosed tool. This will complete the cut without damaging the work. The second method, however, depends upon the skill and experience of the machine operator.

Investigative work has also been carried out on grinding molybdenum. Aluminum oxide-silica bonded wheels are used. Grit sizes finer than 80 grit become loaded rapidly and require frequent

TABLE III

Grinding Data on Molybdenum

	Wheel *	Wheel Speed, Fpm	Work Speed, Fpm	Table Travel, Fpm	Depth of Cut, In.	Coolant
			Cylindrical Grinding			
Roughing	GA-60-L-6-V10	6500	250–300	1.5 to 2	Up to 0.0005	Invincible 40:1
	GA-80-L-6-V10	....	....	....	....	Van Stratten No. 522, 40:1
Finishing	GA-80-M-6-V10	6500	250–300	1.0 to 1.5	Up to 0.0002	Invincible 40:1
	GA-100-M-6-V10	....	....	....	....	Van Stratten No. 522 ,40:1
			Surface Grinding			
Roughing	GA-60-L-6-V10	6500	....	....	0.002 to 0.005	Invincible 40:1
	GA-80-L-6-V10	....	....	....	....	Van Stratten No. 522, 40:1
Finishing	GA-80-M-6-V10	6500	....	....	0.0005 to 0.001	Invincible 40:1
	GA-100-M-6-V10	....	....	....	....	Van Stratten No. 522, 40:1

* Carborundum Co. identification; any comparable wheel may be used.

dressing. Grit sizes larger than 80 grit cut more freely, but the surface finish produced is unsatisfactory. Data shown in table III give the wheels and methods found most satisfactory for both cylindrical and surface grinding. For simplicity, the wheel designations shown are those of the Carborundum Co., but any similar designation might be substituted. For a good general purpose wheel for grinding molybdenum, the GA 80-K, 6-V10 wheel has given excellent results in both cylindrical and surface work.

While these practices have been worked out by Westinghouse, they can by no stretch of the imagination be classified as standards. There has not been enough work done to set up rigid standards. They are, however, practices that have evolved from the limited experience in machining molybdenum and are believed to be the best developed to date. Undoubtedly, better methods will evolve, and more efficient machining will mean greater acceptance of molybdenum as a material that can be incorporated into other products to increase their usefulness, serviceability and life.

Vanstone Joints For Stainless Piping Systems

A JOINING method using Vanstone-type connections for lightwall stainless steel piping has been developed by the H. K. Ferguson Co., Cleveland, to eliminate the necessity for welding and to provide easily dissembled systems for the chemicals, food processing and other industries benefitting from the corrosion resistant properties of stainless piping.

Vanstone or flanged-end fittings are commercially produced in the 125-lb pattern dimensions in stainless so that in the field it has been necessary to Vanstone only the tubing. A portable hydraulic machine, fig. 1, was developed for this purpose by Ferguson engineers. The machine weighs about a ton, costs approximately $2500 to build and is adaptable to any size tubing.

As shown in fig. 2, the unit flares the pipe with a conical roller which is then retracted to permit a cylindrical roller to flatten the flare to a Vanstone end.

Rubber, neoprene and asbestos gasketting have all given satisfactory leak tight joints. The pipe and fitting are secured and pressed together by carbon steel split-type backup flanges bolted over the joint. It is not necessary to face the Vanstoned lips or perform any other machining operations.

Use has been limited to comparatively lightwall tubing. A conservative estimate for 6-in. pipe places maximum wall thickness at 3/16 in., although company engineers suggest that a Vanstoning machine generating a greater hydraulic pressure than the ones used thus far would be perfectly practicable and would be able to Vanstone heavier walled tubing up to the point where the cold working properties of the pipe were exceeded.

Tests reportedly indicate that no deleterious work hardening results from the cold Vanstoning process and there has been no noticeable acceleration of corrosion at the Vanstoned sections. Bench tests on standard 3-in. stainless pipe have established a hydrostatic pressure capacity of 500 lb for the flanged systems.

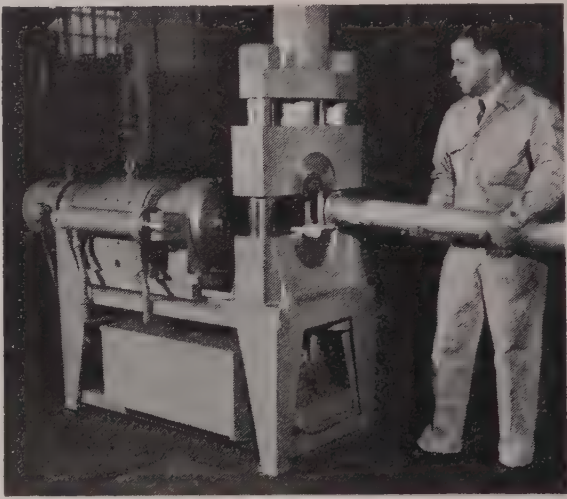


FIG. 1—Length of 6-in. lightwall stainless steel tubing is being removed from the portable hydraulic machine used to cold Vanstone piping joints.

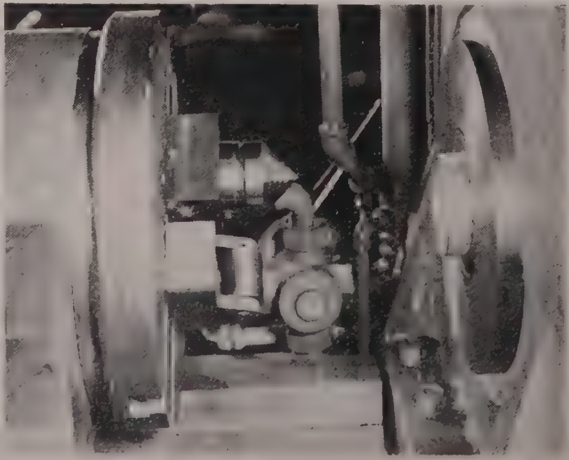


FIG. 2—Conical roller flares the tubing and is then retracted to permit the cylindrical roller to flatten the flare into a flange.

Rolling Raised Steel Type Characters

By HERBERT CHASE
New York

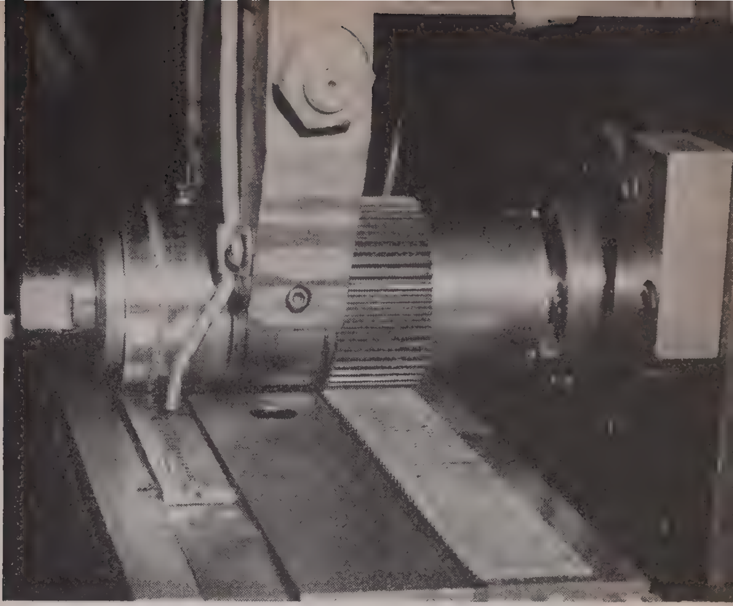


FIG. 1—This Cincinnati milling machine setup is used for rolling raised numerals and characters on the rims of wheels clamped between flanges on the machine spindle. On the spindle is also a pinion that meshes with a rack that rotates the spindle as the table is oscillated. The rack is part of the fixture that holds a series of die blocks into each of which is engraved a recessed character or matrix that forms a corresponding character on the wheel.

○ ○ ○

Round steel blanks, set in a holder on a floating spindle of a milling machine, are rolled against engraved type character dies, yielding clean, sharp type characters of accurate dimension. The manufacturing setup, die construction, and other details of this engraving method are described.

THOUSANDS of wheels having raised type characters are required for the many different machines manufactured by International Business Machines Corp., and economical but mass means of making these are important. Wheels on which the raised characters are diecast, easily and rapidly made at moderate cost, are satisfactory for some purposes. In diecasting, however, neither zinc nor aluminum alloys are sufficiently hard for some applications and no casting method yields finished characters having the close dimensions or precise spacing essential in many machines.

Various methods of producing characters on wrought steel wheels and sectors have been tried, but until recently no method developed yielded consistently the precision and high production at moderate cost sought by IBM.

The technique of rolling the characters into wheels or sectors, while not new, has been improved by IBM to the point that it is now entirely satisfactory from the standpoints of precision, production and cost. SAE 1010 steel blanks of true cylindrical surface, concentric with the hub hole are used. Screw machines produce satisfactory blanks at moderate cost, but other blanks are stamped from sheet stock. Sometimes these latter have hubs welded to the centers of the blanks, after which truing cuts may be needed to insure that the periphery of each part is smooth and true with the hub hole. If the width of the rim of the blank exceeds that of the web or spokes, it is sometimes necessary in rolling the raised characters to provide a holder that supports the rim radially during rolling because of the high pressures applied.

Rolling is employed because it is convenient in producing a piece that has characters around a circle or arc. This method also provides the required sharp definition of the narrow components of the character face and the angular spacing within the close limits specified. Rolling is also a method by which metal can be forced to flow into a series of matrices that are debossed in hardened die blocks with flat faces.

Rolling is done on Cincinnati milling machines because they provide a convenient means of supporting the dies and the blank; of reciprocating the dies under the blank carried on a spindle;

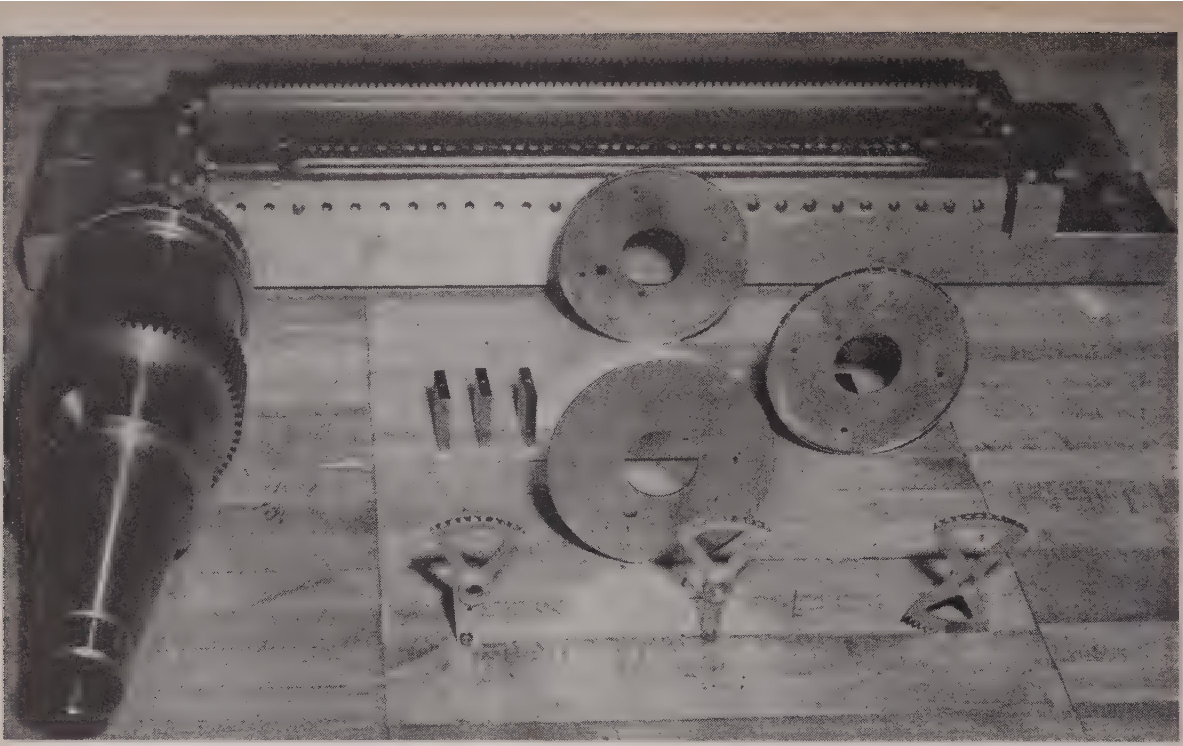


FIG. 2—Characters are rolled on wheels and sectors such as shown here. Also shown is the spindle setup with the pinion, blank and holders. In the background is a fixture that holds a set of die blocks, three of which are shown separately to the left of a blank typical of those on which characters are rolled.

and of applying the required pressure and feed between the blank and the die.

This rolling method of making numbered wheels as frequently tried in the past was done with a one-piece die into which all the character matrices required had been sunk. Experience with one-piece dies at IBM has been that they do not hold the close spacing dimensions required. However, the desired results have been readily obtained by employing individual die blocks for each character. When so arranged, the spacing of the individual blocks can be varied by shimming as may be necessary to hold the required spacing limitations. Each die contains one character only, and the characters are held in a slot in a fixture in which their spacing is adjustable. Fig. 1 shows a setup of this type.

With separate die blocks there is the added advantage that characters can be interchanged or rearranged to different spacing, and if worn or broken, any character can be replaced without engraving a new die block. They are sunk in standardized blocks of oil-hardened steel and ground to size. Characters are engraved in the blocks with carbide cutters in Gorton pantograph engraving machines.

Engraving cutters commonly have side cutting edges at 45° to the vertical (90° included angle), and the ends are lapped to produce a flat at the bottom of the impression and to give a type face $0.002 \frac{+0.000}{-0.0005}$ in. wide. This produces a type face narrow enough to print sharply yet wide enough that it will not cut the ribbon or the paper. The depth from the die face to the bottom of the cut is usually 0.020 in., which is the height of the character radially above the rim of the finished wheel.

The blank holder must be sufficiently rigid to prevent the blank from deflecting from side to side, but must have a diameter smaller than the rim of the blank so as to permit side flow of the metal during rolling. Pressures cause this side flow in addition to that necessary to fill the recesses engraved in the die block.

It is also necessary that the blank holder support the rim of the blank if this rim overhangs the web enough to be deflected radially any considerable amount during rolling. This is accomplished by providing on the inner faces of the flanges forming the holder annular bosses that make a tight fit inside the rim. The blank is clamped coaxially with the spindle of the milling machine between the flanges by a central nut. The spindle is left free to turn but has no axial play.

Fastened to the spindle is a 16-pitch pinion that meshes with a rack mounted in a slot in the fixture so that the rack cannot move in the fixture parallel to its length or crosswise. This arrangement is shown in operating position in fig. 1, and the components, with individual die blocks and rolled parts, are shown in fig. 2. The rack and pinion arrangement can move slightly downward into the fixture against strong springs, because the milling machine table, on which the fixture is mounted, is fed upward during rolling. This rack support is required because there must be no backlash between the rack and pinion as they keep the die in correct angular relation to the blank. In other words, as the blank rolls across the die face, each character being produced on the blank must register perfectly with the corresponding recessed character in the die during every stroke.

The center of the blank rim is set directly over the center of the row of die characters. In rolling, the table, with the fixture and dies, feeds upward at the rate of 0.002 to 0.008 in. per stroke; and it requires 10 to 20 passes to produce characters of the correct depth to fill the die recesses and attain the desired height. Thus far, blanks rolled have varied in thickness from 0.040 to 3/16 in., and from 1¾ to 4¼ in. diam. Table speeds employed range from 250 to 350 ipm.

Floor to floor production rates range from about 40 1¾ in. diam wheels an hr to 30 per hr for 3 in. wheels and 25 per hr for 4¼ in. diam wheels. As many as 10,000 wheels have been produced from a single set of dies, after which the dies were still in good condition. This applies only to dies of oil-hardened steel. Some experiments are underway with carbide die blocks that are only half sintered, engraved, and then completely sintered subsequent to engraving. It remains to be determined whether such dies will prove superior when cost and service life are considered.

Not all blanks employed are complete wheels. When characters are required on a segment rather than on a whole wheel, usually two or more segments are set in a circular holder and are rolled simultaneously. In so doing, the die blocks are set in line with each rim if the rim centerlines are not all in one plane. Bars having single characters on one end have been rolled by using a holder in which several bars are fastened securely in correct radial position. The rolling is then done just as if a single circular blank were used.

Since, in rolling, some metal flows sidewise from the edges of the rim, this flash must be trimmed off. For a blank 0.040 in. thick, the flash may extend almost ⅛ in. at each side. In the case of complete wheels, flash is trimmed simply and rapidly in a lathe. On segments, trimming is done to better advantage in a press, as shown in fig. 3 in which a trimmed blank is shown in the foreground on the bed of the press.

As the rim on this sector overhangs the spokes that support it and trimming must be done on each side as well as along the ends of the rim, the sector is supported between plates whose clamping faces are at right angles to the die motion. The outer edges of these plates act as the shearing edges of a punch which remains fixed to the bed; while the die, attached to the ram, telescopes over the punch when the ram descends. This trims the flash on four edges in one press stroke. On the up-stroke, the front clamping plate moves forward parallel to the press bed to release the trimmed piece and permit its removal.

Since the angular spacing of characters on number wheels must be held to close limits, means must be provided to check this spacing. As reference points for gaging would be hard to establish between characters that vary in shape, gaging fixtures are made to fit the bed of optical comparators. These comparators are standard units equipped with 20-power magnification. On the ground glass screen of these comparators are ruled limit lines within which the image of the character being inspected must fall. Each character on the part is inspected as the part is held in position by a fixture.

With such inspection fixtures, the position of each character is precisely checked. This is of

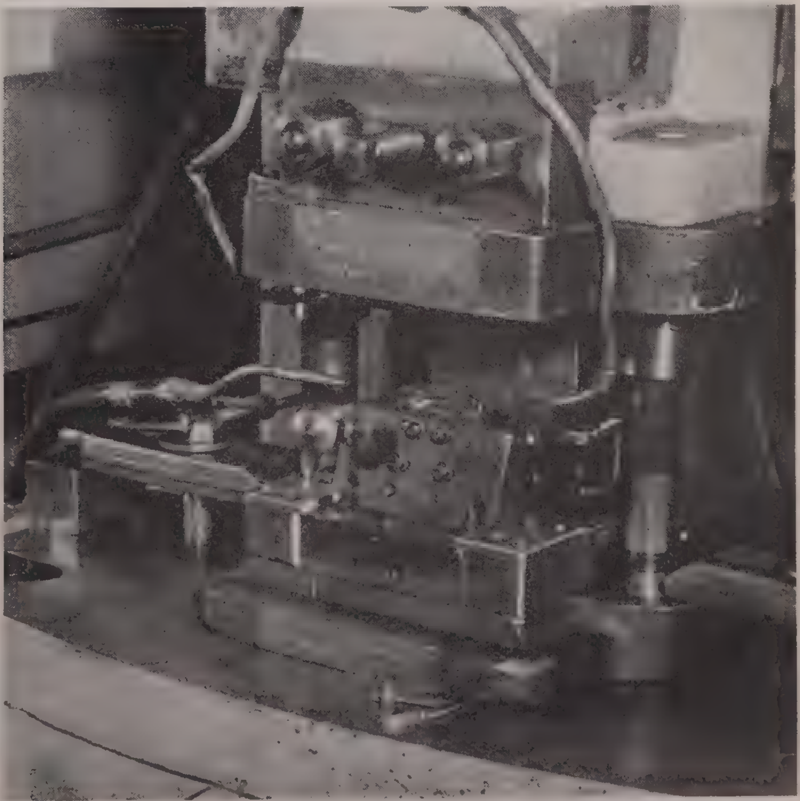


FIG. 3—Presses trim the flash from the edges of numbered sectors while flash on wheels is removed in a lathe. An untrimmed sector is clamped vertically between plates that support it and provide the shear edges of the punch in this illustration. The trim die, carried in the ram, is lowered to shear off the flash.

special help in checking a new setup because, in setting up the die, individual blocks may have to be shimmed slightly to insure correct spacing. Once the spacing is checked and a die block is correctly set and locked, location will not change except as a result of wear or a fault in the functioning of the fixture or the machine. Occasional parts are checked in the comparator during a given run to avoid unforeseen changes. Two comparators are provided in the area devoted to rolling the number wheels, one being used to check each die block after engraving. This assures that the characters are correctly dimensioned, even though a master form is used on the pantograph arm of the engraving machine.

By following the techniques described, steel type character wheels and sectors are produced more precisely than ever before and the results are gratifying. They include better performance of the machines in which the wheels are used, as the wheels do a more precise job of printing. A secondary but important benefit is that wheel life is increased and service on this score is minimized.

. . . NEW BOOKS . . .

"Principles of Metallography," by R. S. Williams and V. O. Homerberg. Fifth edition of textbook reviews the fundamental ideas on which metallography is based and discusses applications of the technique. The book is designed for those using metallography in connection with professional work, but not for specialized workers in the field. McGraw-Hill Book Co., 330 W. 42nd St., New York 18. $4.00. 319 p.

* * *

"Common Sense in Steel Treating," by W. R. Bennett. Book discusses the fundamentals of successful steel treating. The causes of trouble in steel hardening and methods of eliminating the troubles are described. W. R. Bennett, 66 Green St., Brattleboro, Vt. $2.00. 86 p.

* * *

"Symposium on Internal Stresses in Metals and Alloys." Papers presented at a symposium held in October 1947 in London are published in book form. Measurement; origin, control and removal; and effects associated with internal stresses are the broad topics of 36 papers. Discussions are included. Institute of Metals, 4 Grosvenor Gardens, London, S. W. 1. $8.50. 484 p.

* * *

"Professional Registration Laws and the Engineer," by A. M. Sargent. Booklet examines the history and facts behind professional registration for engineers and discusses the effects of licensing on both individual engineers and engineering firms. A. M. Sargent, 19669 John R St., Detroit 3. 75¢. 60 p.

* * *

"1948 Guidebook and Directory for the Metal Finishing Industries." Seventeenth edition of this manual covers polishing, buffing and sanding; cleaning and pickling; electroplating solutions; surface treatments; control and testing; finishing plant engineering; and contains directories of trade names, manufacturers and suppliers. Finishing Publications, Inc., 11 W. 42nd St., New York 18. $1.50. 468 p.

* * *

"Production Costs and Breakeven Points." Three papers presented at a meeting in December 1947 discuss the new meaning of breakeven points, development of standard costs on nonproductive expense, and the wage and price outlook. American Management Assn., 330 W. 42nd St., New York 18. $1.00. 47 p.

* * *

"The Fracture of Mild Steel Plate." Research report describes investigations on the fracture of mild steel plate carried out at the Engineering Laboratory of Cambridge University. British Information Services, 30 Rockefeller Plaza, New York 20. $2.05. 83 p.

* * *

"Managerial Control of Business." Survey gives information on the management techniques used in a firm with 28 years of management engineering experience. Each member of the company's staff contributes a section describing his functions and techniques. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. $5.00. 408 p.

* * *

"Standards of Hydraulic Institute." Eighth edition of this book contains standards for centrifugal pumps, rotary pumps, reciprocating pumps, tentative standards on pipe friction, data on materials for pumping various liquids and other information. Hydraulic Institute, 90 West St., New York 6. $3.00. 209 p.

* * *

"Operating Under the Taft-Hartley Act," by Max Malin and S. H. Unterberger. Revised edition of this book explains the impact of the Taft-Hartley Act on labor relations situations and includes regulations of the NLRB, court decisions and related legislative material. Labor Relations Information Bureau, Standard Oil Bldg., Washington 1. $2.00. 58 p.

* * *

"A Short Course in Human Relations," by F. C. Minaker. Pocket-size booklet offers suggestions to foremen for improvement of their relationship with the men they direct. Dartnell Corp., Ravenswood & Leland Aves., Chicago 40. 25¢ (reductions for quantity orders). 49 p.

* * *

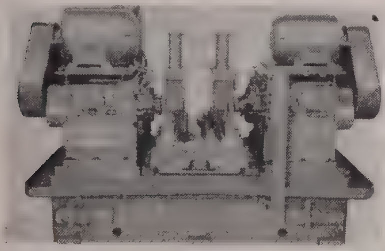
"Practical Considerations in Die Casting Design." Book discusses specific designs and applications of diecastings, of all alloys now in use, and the practical considerations involved in the design of the products. New Jersey Zinc Co., 160 Front St., New York 7. $3.00. 246 p.

New Production Ideas . . .

New and improved equipment described this week includes: A crankshaft milling machine, drilling and boring machines, gap bed lathes, gear and turbine blade checkers, an X-ray diffraction unit, vapor degreasers, a coolant cooler, punching units, a die flipper, a battery charger, clutch driven pumps, self-propelled hoists, and silver brazing alloys.

Crankshaft Milling

FACING and center drilling the ends of crankshaft forgings at the rate of 47 pieces per hr at 80 pct efficiency is claimed for a special purpose machine recently announced. The forging is located in the fixture manually and held by hydraulically actuated clamps. When the cycle button is pressed, the fixture table advances rapidly toward the milling cutters and drops into feed; and both ends of the forging are faced to correct overall length. Inserted carbide milling cutters are used at a speed of 350 sfpm. Centers are drilled in both ends of the forging with drills operating at 60 sfpm. Feeds and speeds are adjustable and stroke may be adjusted from 8 to 12 in. Required floor space is 108 x 70 in. Work cycle is fully automatic. *Snyder Tool & Engineering Co. For more information, check No. 1 on the attached postcard.*

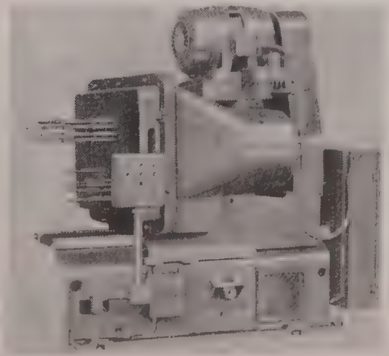


Heavy Duty Face Mill

DESIGNED for rough face milling operations where the greatest wear occurs along the periphery of the tool, the heavy duty model added to the line of E-Con-O-Mill tools features blades set at an angle to allow greatest adjustment in a radial direction. Cutter bodies are made in 8 in. diam and over. All sizes are equipped with the same size tungsten carbide tipped blades and locks as used on the regular mills in this line. Three types of blades, finish ground and ready for work, are for cutting steel, cast iron, and nonferrous materials. *Gairing Tool Co. For more information, check No. 2 on the attached postcard.*

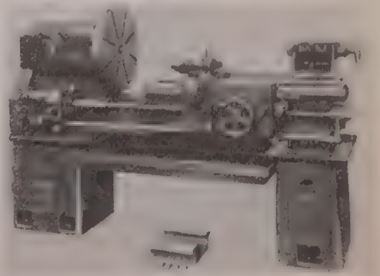
Drilling and Boring Machines

MODELS C2FT, C3FT and C4FT Holesteel floor type units are production machine tool units designed for use in the construction of way type machines for drilling, boring, tapping and similar operations. Dependent upon application and production requirements, they are arranged with standard single spindle heads, fixed center multi-spindle heads, or adjustable multiple spindle heads complete with either standard adjustable spindles or slip spindle plates and spindles. The electrically controlled hydraulic feed system provides infinitely variable feed selection within specified range. The head slide for spindle is guided on bed ways and provided with gib adjustment. On the single spindle head, sliding gears allow seven spindle speeds within the range selected through splined pick-off gears. Adjustable spindle heads have independent spindle speed changes which provide high, low and neutral. Adjustable spindles may be located in any position within the area of the head and at a drive angle of 35° or less. *National Automatic Tool Co. For more information, check No. 3 on the attached postcard.*



Gap Bed Lathes

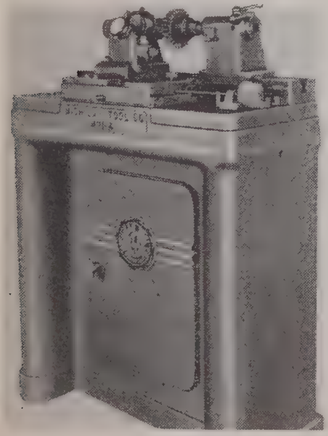
A NEW series of fixed gap bed lathes has been designed for repair and jobbing shops that require versatile medium and light duty engine lathes. The standard or medium duty Cintilathe is offered in six nominal swing sizes, 14, 16, 18, 20, 22, and 24 in. with distances between centers from 30 in. and up in increments of 24 in. Motors supplied are 3 hp for the 14 in.; 5 hp for the 16 and 18 in.; 7½ hp for the 20 in.; 10 hp for the 22 in.; and 15 hp for 24 in. size. The Tray Top or light duty Cintilathe is offered in two swing sizes of 15 and 18 in. with distances between centers from 18 in. and up in increments of 6 in. The motors supplied are 2 and 3 hp for



the 15 and 18 in., respectively. The gap lathe carriage is provided with short wings on the headstock end and the wings on the tailstock end are extended to provide adequate bearing surface on the bed and rigidity of the entire carriage unit. *Cincinnati Lathe & Tool Co. For more information, check No. 4 on the attached postcard.*

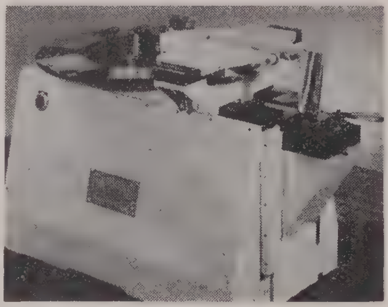
Gear Checking Fixture

A UNIVERSAL Sine-Line checking fixture for checking gears, gear blanks, hobs, worms, worm blanks, milling cutters and form tools up to 10 in. OD and 8 in. max face width, has been announced. With various indicator assemblies available with the machine, this single fixture can be used to accurately check tooth spacing, pitch radius, concentricity and taper of spur and helical gears, plus parallelism and crowning of spur gears. The fixture may also be used for checking rake angle and parallelism of sharpened hobs, runout, depth of tooth of topping hobs, pressure angle of hob teeth, and lead and thread spacing of hobs, as well as to check milling cutters after sharpening. *Michigan Tool Co. For more information, check No. 5 on the attached postcard.*



Blade Checkers

INSPECTION of turbine blades is possible with the new Pant-O-Scriber blade checker, at the rate of a 3-section blade in 43 sec. Completely checking for contour, twist, thickness, width, etc. takes less than 1 min. A permanent inspection record of each blade is obtained at the same time as it is inspected. The blade checker automatically traces the blade at the sections to be checked, and a coordinated rotating scriber automatically produces an exact scribing on a specially coated glass plate of each section as traced. The sections are scribed on the glass plate in relationship to the edge of the glass and to each other. A precision master inspection chart, actual size of the blade, is used together with the scribed plate for inspection purposes. For production inspection purposes a *go and no go* bridge tolerance chart is used. Three models of the Pant-O-Scriber blade checker are available: Model 300 for inspection of 3 section blades; Model 325 for unfinished or finished blades, checking two sections simultaneously; and Model 350, partially hand-controlled, and designed for engineering and research development purposes, master pattern makers, vendors, and tool room use. *Engineers Specialties Div. For more information, check No. 6 on the attached postcard.*

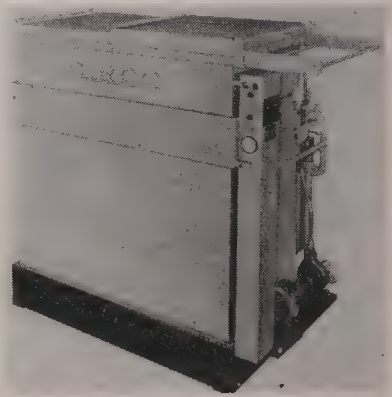


X-Ray Diffraction Unit

A NEW high intensity, water-cooled X-ray diffraction unit and a high intensity, high angle spectrometer have been designed for classifying and identifying metals and alloys for grain size, orientation, effects of rolling, drawing, annealing, fatigue, ageing and other physical and chemical changes. The Norelco diffraction unit incorporates a high capacity, full wave rectified high voltage generator, an automatic control system, improved cooling system, and automatic beam shutters. As many as four different diffraction cameras may be operated simultaneously on the new unit. The Norelco 180° high intensity, high angle Gieger counter, X-ray spectrometer may be attached to the water-cooled diffraction unit, in units of one or two. The electronic circuits associated with the spectrometer attachment may also be used for fluorescence analysis equipment and for radioactivity studies. *North American Philips Co., Inc. For more information, check No. 7 on the attached postcard.*

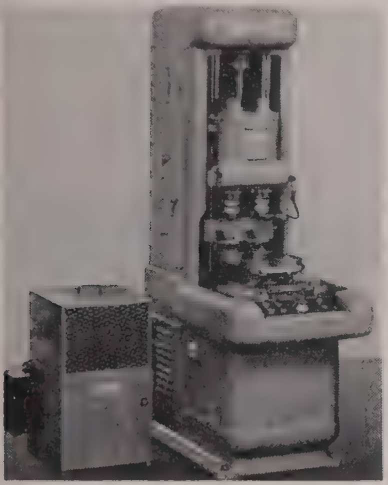
Stainless Vapor Degreasers

AUTOMATIC, push-button controlled, vapor degreasers on which all surfaces exposed to solvent vapors are protected by stainless steel, have been announced. A built-in reservoir tank for liquid solvent flushing and for automatically restoring solvent to proper operating level in tank, as well as conserving shop space is another feature. Elimination of moving parts assures trouble-free operation. Push button controls with indicating lights, and a temperature gage show operating condition of the degreaser. *Circo Products Co. For more information, check No. 8 on the attached postcard.*



Coolant Cooler

A 5-GPM coolant cooler for grinding, honing and machining operations increases accuracy of finished product, permits faster grinding, honing and heavy metal removal; and enables rapid machining of aluminum and magnesium without distortion. It is designed to continuously maintain coolant temperature at a maxium of 20° below room temperature at rated capacity. Features include the use of straight passages for uninterrupted flow of coolant through the cooler at high efficiency; minimum floor space; insulation of the unit for high thermal efficiency; independence from other services such as water; ability to handle conventional coolants; and elimination of operator attention. Thermostats are adjustable to maintain temperature between 20° below and 10° above room temperature. *Frostrode Products. For more information, check No. 9 on the attached postcard.*



Portable Drill

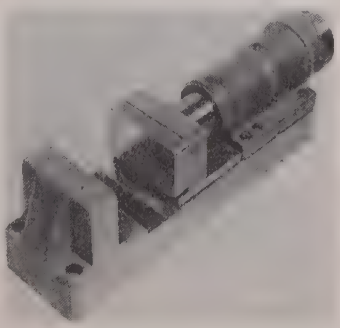
DESIGNED for continuous, stall-free drilling through tough metals, a 7 lb, ½-in. portable electric Thor Silver Line drill is said to provide power unequaled in its weight class. To keep the drill cool under heavy load, ventilation is provided through large slotted ports. Features include a free speed of 500 rpm, ball bearing construction, removable dead handle, steel bearing inserts, removable switch handle, precision gearing and a three-jaw Jacobs key type chuck. The drill is 11 in. long. *Independent Pneumatic Tool Co. For more information, check No. 10 on the attached postcard.*

Temperature Indicator

HIGH or low temperatures can be spotted quickly with the Speedomax indicator and recorder, which logs as many as 160 separate thermocouple temperatures in succession at a rate of 4 sec per point. When temperatures reach a preset limit, the instrument automatically starts a recording chart drive that records all points as a series of numbered dots, and operates an alarm. When trouble develops, the operator cuts thermocouples out of the measuring sequence, in banks of 20 at a time, until the instrument is concentrated on the particular group of temperatures. The instrument can also be set to record any single thermocouple or to record all points continuously. *Leeds & Northrup Co. For more information, check No. 11 on the attached postcard.*

Punching Units

STANDARDIZED hydraulic punching units with cylinders interchangeable on different bases are now available to permit equipment salvage when retooling for production jobs involving shearing, punching, notching, trimming or forming and are said to eliminate the need for large presses and expensive dies. They have been designed to deliver almost 1/3 more force than usual in cylinders of this size. The units are available in eight different types of base mountings, including closed end, open end, floating type, rocker type, front or rear end flange mount, open end two-guide pin type, and open end three-guide pin type. They are standard in 2, 3, 4, 5 and 6-in. diam and stroke lengths of 1, 2, 3, 4, 5 and 6 in. Innovations in the hydraulic system of the unit include positive hydraulic return of the piston in the unit without increasing weight or size. Pistons are of sleeve construction and provide full length guides during the stroke, which in addition to hardened, ground ways, maintains high precision of punch alignment and permits accurate off-center punching. *Progressive Welder Co. For more information, check No. 12 on the attached postcard.*

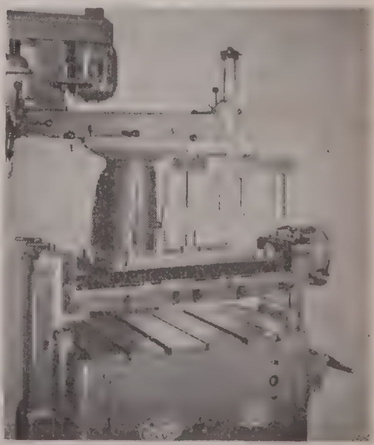


Diamond Tool Accessory

THE Diamond-Miser, an accessory for production grinding machines, controls various aspects of the diamond wheel dressing operation, preventing misuse and diamond wastage. It consists of a special diamond tool holder which is installed upon the grinding machine in a position that assures the diamond being presented to the wheel at the correct angle for efficient cutting. A metered indexing mechanism automatically rotates the diamond tool a pre-determined number of degrees. Control of the tool angle and metered rotation prevent facets from passing the center line; the diamond is not allowed to wear into large, ineffective flats. *Wheel Trueing Tool Co. For more information, check No. 13 on the attached postcard.*

Die Flipper

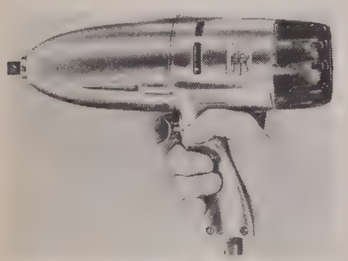
A NEW feature of the die flipper is the addition of a rear lifting device (illustrated) that makes possible the mechanical removal of the entire die bed or punch holder and placement of either on a rolling truck while work is conducted to the other. The die flipper was originally introduced to speed up die tryouts and assembly processes. One die maker can drill, tap and try out, with the punch holder and die shoe clamped to the machine. The flipper can take apart and turn over a die set 20 x 40 in. with 12 in. shut height, with pins engaged in bushings 4 in. The new model is also designed for counterboring for heads of screws tapped into the punch flange. A special ¾ in. drill chuck is available for this purpose. All four sur-



faces of a die set can be exposed toward the drill or tapping device. Capacity of the radial drill has been increased from 1¼ to 1½ in. with speeds of 200 to 1200 rpm. *Moore Special Tool Co. For more information, check No.* 14 *on the attached postcard.*

Impact Tool

HEAVY machinery maintenance jobs can be handled with the 8U model electric impact tool, recommended for work such as removing covers from machines, tightening or loosening nuts on large pipe collars, and general heavy work. With standard accessories, the new model is rated to run and remove nuts up to ⅝ in. thread size; drive and remove studs; apply and remove machine screws of all kinds; run wire brushes; drill metal and masonry; tap; and ream. The impact principle operates whenever resistance is met and provides extra power to push through the job. Virtually no torque reaction is transmitted back to the operator. *Ingersoll-Rand Co. For more information, check No.* 15 *on the attached postcard.*



Collet Closer

LATHES and hand screw machines can be converted into semi-automatics with the new Ball-Matic collet closer and stock feeding attachment, that operates at spindle speeds up to 5000 rpm. It feeds stock automatically in lengths to tenths, with no pull back from stop, speeding production by eliminating stopping the lathe and hand-feeding the stock. There are no closing fingers, no rocker arms, no springs; only a series of enclosed steel balls. Models are available in ½, ¾, and 1 in. *N. C. Nichols Machine & Engineering Co. For more information, check No.* 16 *on the attached postcard.*

Battery Charger

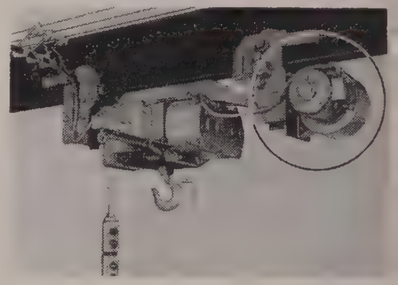
ALL electrical connections, relays and other working parts on the Charg-O-Matic, a new automatic single-circuit motor generator battery charger, are mounted on a panel inside a metal cabinet in which the horizontal motor generator is housed. The outfit is of the dead-front type to prevent accidental contact with electrical equipment. Designed to charge a lead-acid battery in 8 hr and a nickel-alkaline battery in 7 hr, this charger replaces the Model H previously available. A control panel is set at an angle at desk-top level and a pilot indicates when the set is on charge. The unit is portable and occupies less than 4 sq ft. *Hertner Electric Co. For more information, check No.* 17 *on the attached postcard.*

Oil Inspection Kit

THE condition of lubricating oil can be ascertained with a recently developed testing kit that measures four classes of conditions: change in viscosity due to fuel dilution or other causes; amount of the asphaltic and other oil breakdown substances; amount of dirt, metal particles, other solids and water; and acidity, showing whether corrosion is possible. The oil from four engines can be analyzed for all four classes of contaminants in 25 min. *Gerin Corp. For more information, check No.* 18 *on the attached postcard.*

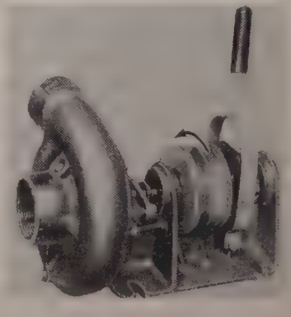
Self-Propelled Hoists

THE adaptation of fluid drive to high speed self-propelled hoists has recently been developed. A double-action hydraulic coupling, connecting the motor and a simple gear train, provides a sustained flow of power to impart smoothness of operation. Employing only the basic fundamentals of hydraulics, the coupling eliminates jerks and jolts by absorbing shock loads and dampening out torsional vibrations. Transmitted by the mass and velocity of the enclosed fluid, the full torque of the motor is evenly applied at all output speeds. Advantages include handling efficiency and prolonged wear-life, flexibility of acceleration and deceleration, closer control of heavy, bulky loads in limited space acreas, and smoother braking. The fluid drive unit is said to be equivalent to a variable-speed, slip-ring motor drive. *Robbins & Myers, Inc. For more information, check No.* 19 *on the attached postcard.*



Clutch Driven Pumps

THE principal feature of a new line of clutch driven pumps is the adaptation to a pump of the heavy duty, twin disk clutch over the impeller shaft. This design has been recommended for use as a washing, coolant, flushing, dewatering, or agitating pump. Pumps are of all bronze construction, in sizes for 1½ and 2-in. pipe.



The range is up to 300 gpm. Pressures at reduced flows are approximately 25 lb. Engagement of the clutch permits immediate flow of fluid; disengagement eliminates the necessity of stopping and starting the main drive motor when the use for the pump is no longer required. Models include a straight centrifugal pump in right and left hand rotation; reversible pump that operates in either direction of rotation; and a self-priming centrifugal pump which will lift water 20 ft. *Marine Products Co. For more information, check No. 20 on the attached postcard.*

Silver Brazing

A HIGH silver alloy developed to supplant regular silver brazing alloys is available to the welding industry. Designated Eutecrod 1700, it is thin-flowing. For stainless steel, copper, brass, bronze, tungsten carbide and steel, the material is said to give better color match to stainless and is particularly recommended for making lap, square, butt and T joints and for sealing and filling small cracks and defects. Good results are claimed in joining tungsten carbide tips to steel shanks and in welding light gage metal as well as in joining of stainless steel and welding of steel to other metals. The alloy bonds at 1020° to 1250°F and has a tensile strength of 64,000 to 68,000 psi. The rod is available in 3/32, 1/16, 3/64, 1/32 and 1/64-in. diam. *Eutectic Welding Alloys Corp. For more information, check No. 21 on the attached postcard.*

Power Belt Conveyer

FOR horizontal application in handling parts, cartons, boxes, and bags, a power belt conveyer named Power-Veyor is available in widths of 8, 12, 14 and 20 in., and is built for permanent or semi-permanent installation. The unit is comprised of a drive section, with motor and drive pulley; intermediate sections of rapid-roller gravity conveyer; and a takeup section. An idler roller permits return of the Power-Veyor belt. Intermediate conveyer sections are of two types: Type A, with rollers projecting above the channel frame; Type B, with rollers below the channel frame. The belt is 3 ply, 28 oz canvas duck, rubber impregnated, with a vulcanized friction top and friction back. With a 1/3 hp motor the unit will move 1200 lb distributed load at 75 fpm. *Rapids Standard Co., Inc. For more information, check No. 22 on the attached postcard.*

Crane Cab Conditioner

THE condenser unit of crane cab conditioning equipment recently developed, is located at any convenient place on the crane, while the evaporator, or blast coil, is placed in the cab. The two units are connected with refrigerant lines properly secured and protected against line breakage by vibrator eliminators. The air filter unit is available for ac or dc operation and is equipped with a slow speed fan. The make-up air passes through a screen-type filter, also through an electrostatic filter removing all smoke and vapors. Both the make-up air and the recirculated air pass through a bank of 12 activated carbon canisters which remove waste gases and fumes and assure clean, filtered air at all times. *Lintern Corp. For more information, check No. 23 on the attached postcard.*

Water Demineralizer

A NEW cartridge-type water demineralizer for use in metal finishing plants converts ordinary tap water to the chemical equivalent of distilled water by passing it through a series of four beds of ion exchange resins. In the first, water is acidified; then neutralized and adsorbed. Metals removed include sodium potassium, calcium, magnesium, iron, copper, and lead; salts removed: sulphates, carbonates, and chlorides. *Penfield Mfg. Co., Inc. For more information, check No. 24 on the attached postcard.*

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Diecasting Machines

HYDRAULIC diecasting machines, featuring rapid or slow metal injection as desired, are described in bulletin. Pressure multiplier steps up the ending pressure to as much as 5 times the starting pressure with maximum being 50,000 psi. *Kux Machine Co. For more information, check No. 25 on the attached postcard.*

Arc Welding

ILLUSTRATED folder describes arc welding head and controls designed for open-arc, shielded-arc or submerged-arc welding with either ac or dc. Advantages of this line are explained with specifications and engineering service described. *Auto Arc-Weld Mfg. Co. For more information, check No. 26 on the attached postcard.*

Balanced Positioner

INFORMATION on a universal balanced positioner for holding and positioning work during maintenance and production jobs is given in bulletin. Power attachment is available to enable the positioner to rotate work at any speed desired up to 6 rpm. *Aronson Machine Co. For more information, check No. 27 on the attached postcard.*

Corrosion Resistant Coatings

METHODS of applying corrosion resistant linings and coatings are described in bulletin and the industrial uses of Neoprene, Koroseal, Heilex and other plastics in combating corrosive attack are discussed. *Heil Process Equipment Corp. For more information, check No. 28 on the attached postcard.*

Coal Sampler

INFORMATION is given on an automatic coal sampler, adaptable to any conveying system, which extracts accurate samples of coal at predetermined short intervals and feeds the sample to a crusher in preparation for analysis. A reciprocating model for wide streams of coal is also described. *Heyl & Patterson, Inc. For more information, check No. 29 on the attached postcard.*

Glass Insulation

CATALOG has been prepared to provide a practical demonstration of uses to which Fibreglas in its various forms may be put. Included in this illustrated material are examples of air conditioning, appliance, industrial applications and reinforced plastics. *Owens-Corning Fibreglass Corp. For more information, check No. 30 on the attached postcard.*

Furnace Brazing

CASE histories of jobs in which furnace brazing has led to faster and cheaper assembling operations are discussed. Information on the joining of light to heavy parts and the joining of unlike metals is given. *Ferrotherm Co. For more information, check No. 31 on the attached postcard.*

Tool Crib Control System

BULLETIN gives information on a cross-filing system for tool crib control which permits instant location of tools on loan and provides a perpetual inventory which can be quickly checked. System also indicates tool activity. *McCaskey Industrial Controls. For more information, check No. 32 on the attached postcard.*

Grinders and Polishers

SPECIFICATIONS for grinders, polishers and buffers are given in bulletin 112. Grinders range in size from ¼ to 50 hp, and buffing and polishing machines from ½ to 60 hp. *Standard Electrical Tool Co. For more information, check No. 33 on the attached postcard.*

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What's your need in SIZE?

Globe seamless steel tubing is made hot finished and cold drawn in alloy and carbon steels in sizes from ½ inch to 6⅝ inches outside diameter.

Globe seamless stainless steel tubing is available in tube sizes from ½ inch to 6⅝ inches outside diameter and in pipe sizes ⅛ inch to 6 inches, standard, extra strong and double extra strong weights.

Gloweld (electric welded) stainless steel tubing may be had in sizes ranging from ¼ inch to 5 inches outside diameter inclusive, in standard weight pipe (schedule 40) sizes ⅛ inch to 2 inches, and in light weld pipe (schedule 10) size ⅛ inch to 4½ inch, inclusive.

Your tubing needs may lie somewhere within the above ranges — whatever your requirements, Globe is qualified by experience and facilities to supply you with tubing of the quality and uniformity you demand. GLOBE STEEL TUBES COMPANY, Milwaukee 4, Wisconsin.

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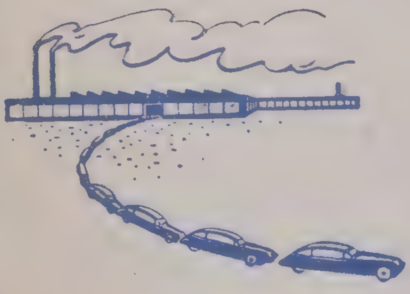
Assembly Line . . .

WALTER G. PATTON

• Olds to introduce its Futuramic 1949 models on Dec. 19 . . . Cars to have new high compression engine . . . Program of GM's Australian light car announced . . . Jalopies on the highways partially responsible for scrap shortage.



DETROIT—At a press preview this week S.E. Skinner, vice-president and general manager of Oldsmobile, confirmed reports that the 1949 Futuramic series will consist of three lines of cars. The 1949 Series "76" and the "98" Futuramics will go on display in dealers' showrooms on Dec. 19. Introduction of the third line of cars has been set for January 1949.

As announced previously, the "98" series will be powered by the high compression Kettering-type engine which has been officially named the Rocket.

The new high compression engine is designed basically to operate at 12 to 1 compression ratio although the present engine operates at only 7.25 to 1. With minor changes the new power unit can be stepped up to its maximum efficiency, resulting in a saving in fuel consumption of 35 pct, according to Olds engineers. The present engine is expected to give the owner a minimum of one more mile per gallon of fuel.

Rated horsepower of the Olds six cylinder engine has been boosted from 95 to 105 by changing the bore and stroke and making other adjustments.

The new "76" line features the same postwar styling used in the "98" series. Curved glass is used in front and in the rear. Windows have been enlarged. The car has wider seats in front and rear and more leg room than the present models. Interior appointments are also more colorful.

In the "98" series cars GM Hydra-Matic drive will be standard equipment. Directional signals and windshield washers are also included in the standard list price. Hydra-Matic drive will be optional equipment on the "76" series.

Prices of the new "76" models have been boosted from $45 to $60. Prices of the Futuramic "98" models have been increased a total of $360 to $370, including the new high compression Rocket engine, Hydra-Matic drive, directional signals and windshield washers. The net increase in price after adjusting for equipment has been estimated at about $150, including the new engine.

The series "66" and "68" has been discontinued for 1949. Production of engines for replacement will be continued, it was disclosed.

The new engine plant is expected ultimately to produce 40 of the new type engines per hour. At the present time output is at the rate of 30 units per hour and the plant is operating two shifts. If the demand for the new engines develops as expected, Olds officials believe it will be necessary to double the capacity of the present engine plant. No new building will be required, it was explained, although a number of stations on the present line will have to be duplicated. Capacity of the 6 cylinder Olds engine line is 50 to 60 engines per hour.

Mr. Skinner predicted that Olds production for the current year may reach 200,000 units. A minimum increase of 10 pct in 1949 output is anticipated.

AT the present time, Olds has an unfilled bank of 1,114,000 orders, equivalent to 5 years' production at the 1948 rate, according to D. E. Ralston, general sales manager. The fact that Olds has what may be the largest number of unfilled orders in the industry may be partially explained by the fact that commencing early this year dealers were informed of company plans, including the new high compression power plant. Anticipating an extremely favorable public response, the dealers have now booked more than a million customers. Orders are still coming in at a rate higher than the present production rate, it was disclosed.

Those who have seen the new Oldsmobile engine plant agree it is probably the most modern machine tool setup in the industry. Some difficulties were experienced getting into production but output is climbing and may be expected to reach capacity in the near future.

An unexpected reward Olds has already experienced in its new engine plant is the apparent pride workmen are taking in the new equipment. According to Olds officials, the engine plant is fast earning a reputation as "a good place to work," and this is expected to assist the company in hitting its production goals.

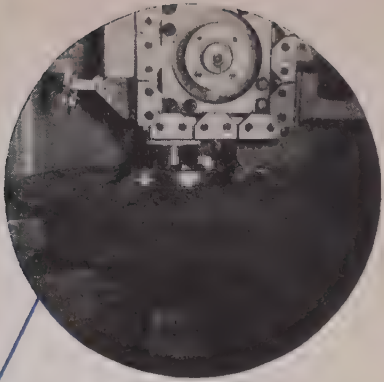
Exclusive of engineering and development, Olds has invested more than $10 million in its new engine plant.

General features of the new 90° overhead valve Rocket engine are now well known. The crankshaft of the new engine, which is much shorter than the shaft for the in-line engine, has five bearings. The intake manifold has been completely redesigned. Hydraulic valve lifters are used. A completely new carburetor is specified. The ignition system is slightly modified as compared with the previous engine.

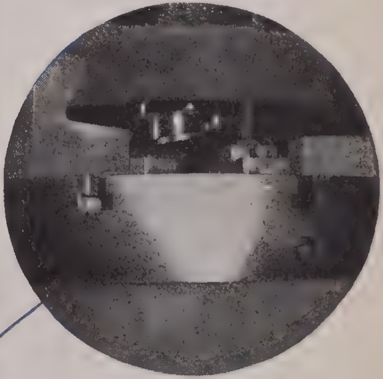
One thing evident to all plant visitors at Lansing is the great number of precision gages used to insure accuracy. At convenient locations along the line, the latest type precision instruments check accuracy of every step in the production process. Plant layout is such that blocks can be quickly drawn from storage, thereby iso-

BULLARD MAN-AU-TROL V. T. L. AUTOMATICALLY MACHINES DIESEL WHEELS 3 TIMES FASTER

This BULLARD 54" Man-Au-Trol V.T.L. in the B. and M. R.R. shops at North Billerica, Mass., machines a wrought steel Diesel locomotive wheel in less than an hour, three times faster than the previous method. Man-Au-Trol Cuts Time between Cuts and Time on Cuts.



Here the boring tool and turning cutter on B. and M.'s Man-Au-Trol V.T.L. have nearly finished their cuts. When finished, the head moves to the right to straddle face the hub.



View from underside of wheel showing boring tool at end of cut, ready to move to the right to take straddle cut. Note lower straddle cutter on right side of bar.

Here you see the finish of the hub straddle facing operation. Now the head and bar move left to center of bore and rise to index position for next operation.

Your investigation of BULLARD Man-Au-Trol for your work will convince you that its combination of versatility, accuracy, productivity, cost-cutting ability is hard to beat. Write for Bulletin MAV-G-1, today, THE BULLARD COMPANY, Bridgeport 2, Connecticut.

BULLARD

MAN-AU-TROL

BULLARD CREATES ***NEW METHODS*** TO MAKE MACHINES DO MORE lating any portion of the line which may not be operating.

At the press session, Mr. Skinner disclosed that Olds plans to produce a "hardtop" convertible in 1949. Frame and body are the same as the present convertible; the top is a single steel stamping. The new model, which is scheduled for introduction late in the spring, will be in the super deluxe class and is expected to draw its buyers mostly from the present purchasers of convertibles. At the present time, convertible models account for 18 pct of the "98" series and 8 pct of the "76" production.

•

GM Builds Light Car For Australia; U. S. Public Almost Got It

Detroit

• • • **The General Motors** light car the U. S. public almost got—or a reasonable facsimile—has gone into production in Australia. Named the Holden, this 4-door, 5-passenger sedan weighing approximately 2200 lb has a 103 in. wheelbase. Unlike any of the present GM cars, the Australian model has integral body-frame construction. In recent tests, over varying terrain, more than 30 miles for American gallon of fuel was reported.

The 132.5 cu in. 6-cylinder engine has overhead valves and a three-point rubber suspension. Bore and stroke is 3 x 3⅛ in. The powerplant develops 60 brake hp. and is rated at 21.6 hp.

The cars have been designed particularly to meet Australian requirements. Experimental cars built here and tested at GM Proving Ground have been thoroughly road tested in Australia.

The 15 in. dia wheels use 5.50 4-ply low pressure balloon tire.

General Motors officials have explained that General Motors-Holden's Ltd. undertook to manufacture the car in Australia at the request of the Commonwealth Government. At the present time manufacturing operations are concentrated at Fishermen's Bend, Victoria and Woodville, South Australia. Assembly plants are located at Melbourne, Sydney, Adelaide, Perth and Brisbane.

Under agreement with the Australian Government only 10 pct of the list price of the car and 5 pct of the weight can be accounted for by imported parts and accessories and other components.

The Holden has a 53 in. tread in front and a 54 in. tread in rear. Overall height is 61 11/16 in. Coil springs are used in front and semielliptic in the rear. Transmission is single plate dry disc type, cushioned by multiple springs. The gearbox is three-speed selective type. The fuel tank holds 9½ Imperial gallons.

GM IN AUSTRALIA: *Weighing in at 2200 lb is this first Australian-built automobile—the Holden. It is now in mass production at the General Motors—Holden Ltd. plant. The car has a 103 in. wheelbase and is reported to travel more than 30 miles on an American gallon of gasoline.*

•

Old Cars on Road Add To Our Scrap Shortage

Detroit

• • • **One reason for** the scrap shortage is the fact that an estimated 14 million cars which would normally be in auto graveyards are still on the highways.

According to an estimate published in Automobile Facts by the Automobile Manufacturers Assn., this is the number of cars more than 10 years old now in operation. The agency also estimates that 2 million cars in use today are 15 or more yr old.

A reflection of the degree of antiquity of the present American automobile is the fact that last year replacement parts output had an aggregate value of $2.3 billion at wholesale prices—three times the highest postwar record.

•

Cost of Living Drops Doesn't Change GM's Adjustment of Wages

Detroit

• • • **The drop in** the cost of living during the last quarter was not sufficient to require any change in the cost-of-living allowance which General Motors will pay to approximately 338,000 hourly-rated employees during December, January and February.

GM's current wage adjustment formula provides that wages and salaries in GM be adjusted quarterly in line with the increase or decrease in the consumer price index of the U. S. Bureau of Labor Statistics. The BLS Index for Oct. 15, made public today, was 173.6 as compared with the BLS Index of 173.7 for July 15, the date on which GM based its last cost-of-living adjustment.

Quintessence of Utility

● Modern designers are proving that beauty often leads to the ultimate in utility. This new trend is finding full expression at Auto-Lite's great Bay Manufacturing Division in Bay City. Here under one roof are the technical skills and production capacity for a new art rendered in plastics including brilliantly colored elastomeric plastics, decorated metals and metal-plastic combinations. The artistic skill of Auto-Lite's Art and Style Division is available on matters of design and development.

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Washington . . .

EUGENE J. HARDY

• Capital experts see good times extending throughout 1949 . . . Fight over controls, taxes forecast . . . Little immediate reduction seen in demand or prices for durables.

WASHINGTON — Qualifying their forecasts with the usual "except for unforeseen developments," the so-called economic experts here, in government and out, are generally looking for 1949 to be another "good" year for industry and business in general.

The worst that is expected is a very minor recession but for the most part this is held to be unlikely. They do look for perhaps a little more inflation, some breaks along the high-price front in those commodities which are no longer in short supply. These are expected to occur product by product, perhaps industry by industry, and in the long run should result in the settling down of price levels to normal ratios.

All in all, predictions of continued high business activity throughout next year are largely pinned on the prospects for continued high levels of consumer demand, of continued full employment, and continued full production as a whole.

Admittedly some of the big backlogs of demand have been substantially satisfied; it is obvious that for such lines the future demands will be based on current rather than accumulated needs. Prices have softened already in some fields and prices have been leveling off for a few selected products such as certain appliances and hardware items—and in soft goods.

Nevertheless, there is still excess demand in most basic fields such as steel, aluminum and cement. Government experts see little chance of any breaks in the prices of such materials or in most related metalworking and manufacturing fields such as automobile production. In fact, while they are far from happy at the prospect, it is admitted that prices of such products may rise still further before they level off. This is particularly regarded as true should the anticipated fourth round of wage increases materialize.

There are a few who are not so optimistic about next year. They believe that the fading of war backlogs in some lines is just a beginning and forecasts a decline in production and overall employment. They say that many firms have expended large sums on plant expansion and installation of new or additional equipment at high prices; this, they feel, has somewhat weakened the financial position of industry.

THIS latter view is not upheld by the Securities & Exchange Commission. It reports the working capital of the nation's corporations is running around a $35 billion rate for most of 1948. More than a third of this total is invested in government securities which does not indicate any shortage of ready cash for working purposes.

Nor does such thinking agree with Bureau of Labor Statistics findings. Capital expenditures for plant and factory improvement in 1948 will probably exceed that of 1947, the BLS says, and it adds that "work is still going forward on many of these postwar programs for replacement, modernization, and expansion."

Of more importance than estimates of available capital is the bugaboo of possible government controls and the tax problem. These could drastically alter the picture.

It stands to reason that there is little chance of tax reduction next year. On the contrary, there is likely to be a determined drive on the part of the Administration to obtain some new form of the excess profits tax—although not to the extent of the wartime rates.

A hard fight to eliminate specific excise taxes also is in prospect but it is unlikely that this move will get very far in view of their revenue producing ability. It is also likely that in a drive to increase the government take, there will be attempts to add new excises to the present list.

Most observers here are inclined to guess that high corporate taxes stand a better chance of enactment than any version of the excess profits tax. The longer the fight is drawn out, the better chance tax opponents feel they have in defeating tax moves particularly should the present revenue keep running ahead of administration spending.

AS to controls, it is to be remembered that the Administration's campaign in the recent election pledged enactment of some sort of controls over prices and inflation. Enactment of standby allocation powers and standby price control powers, as a club, would not be surprising to observers here although there is still plenty of opposition on the Hill.

General optimism now prevails as to industrial, business, and employment levels. These, as calculated by the BLS, place current industrial output as a whole at nearly double (about 90 pct) the prewar levels while heavy manufacturing such as steel, automobiles, agricultural and other heavy machinery and so on is operating at or near capacity.

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he "can't be done" hardening job...

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. . . and set 2 records. When time is short, jobs like this 13" O.D. x 2" face spur gear are beyond the range of conventional hardening methods. But they're duck soup for Flamatic. Perfection Tool & Metal Heat Treating Co., Chicago heat treater, selectively hardened this gear in record time (set-up in about one hour, heating cycle 1 minute 40 seconds) and with record results. Core properties not changed; specs met or exceeded; distortion negligible . . . Flamatic – and only Flamatic – offers all these advantages: (1) rapid heating: flames put the heat where you want it for the precise pattern you specify. (2) electronic temperature control: you preset the desired temperature to a pin point, **and get it every time** within plus or minus 5°F. (3) Oil quenching, that makes cracking a thing of the past, cuts distortion to new lows, eliminates corrective operations . . . So, if you process gears and similar parts up to 18" O.D., or shafts up to 30" long, investigate Flamatic before you invest in any hardening equipment. Write for Booklet featuring 6 case histories: Publication No. M-1658.

CINCINNATI

E CINCINNATI MILLING MACHINE CO.

Cincinnati 9, Ohio, U.S.A.

flamatic

peak of around $18 billion in 1948 and initial government forecasts for next year places building activity at the same figure, including 900,000 new dwelling units. And while commercial exports are down somewhat for this year, an expected expansion in foreign aid may prevent further sagging.

In addition to the industrial picture, government expenditures are almost certain to be somewhat higher than in 1949. In view of the stepped-up foreign aid program and expanded defense planning, government people are now talking of $44-$45 billion as the likely budget next year.

These combined factors are seen as sustaining high national production and, of course, high employment. The 1948 national product—total production of materials and services—will equal the current $250 billion. Employment has been running above the 60 million figure, not counting the 1.5 million in the armed services. As a result, the 1948 disposable income, including $13 billion in savings of one kind or another, will exceed $190 billion (after taxes).

There are factors which could seriously affect the 1949 picture. One is the Treasury cash position. As already stated, there is likely to be little change despite an anticipated rise in government expenditures.

Another is the credit situation. It seems likely that the Administration's main attack on inflation may start with stronger credit controls. More specifically, it may ask for a law authorizing the Federal Reserve Board to require higher bank reserves when deemed necessary. But such a move will probably be made with caution since it would have the effect of drying up funds for capital investment.

As for consumer credit, despite tighter credit restrictions imposed during 1948, there is still a large volume of spending. And while the Federal Reserve Board finds that the lower wage groups have largely spent any wartime savings, there is still a large volume of liquid assets in the hands of the buying public.

Thus, the Board sees little indication of lessened demand for such things as houses, automobiles and many types of durable goods. But there has been a change of direction; the general public is now digging down into savings for down payments and thus expanding consumer debt regardless of Regulation W. This has the effect of slowing down but not curtailing demand.

As to prices, the Agriculture Dept. frankly expects further declines in the prices of some agricultural products despite government price supports for some commodities. Eventually this will be reflected in lower retail prices for goods in such related manufacturing fields as textiles and shoes and varied soft goods. In some of these, production has slowed already and price declines have been noted.

On the other hand, the BLS tabulations continue to show an upward trend in most industrial commodities which do not require farm products as raw materials.

As already stated, the experts expect some further small increases for iron and steel, nonferrous metals, automobiles and other metal products. Such price weaknesses as have already showed up in the durable field have been confined to goods where supply has caught up or has nearly caught up to demand. This has resulted only in the buyer taking more time to choose before spending.

•

THE BULL OF THE WOODS

BY J. R. WILLIAMS

NOTICE WEAR THESE GOGGLES WHEN GRINDING
WHAT? YOU SAY GOLF DOES THAT TO YOU? YOU MEAN TO SAY THAT ALL THESE STIFF-LEGGED GUYS I BEEN SEEIN' AROUND HERE LATELY IS CAUSED BY GOLF?
YEH--IT'S KNOWN AROUND HERE AS **GOLF LEG** AND IS CAUSED BY REPAIRIN' GOLF CLUBS ON THE COMPANY'S TIME!
REDRAWN BY REQUEST
T. M. REG. U. S. PAT. OFF.
"STICKIN'" THE COMPANY
J.R.WILLIAMS
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All Consumers Use More Coal Except Railroads

Washington

• • • **Production of** 630.6 million tons of bituminous coal and lignite during 1947 was the greatest in history, the Bureau of Mines says in releasing final tabulations for last year. This figure represents an 18 pct increase over 1946 and 10 million tons over peak output.

Strip mining increased 23 pct last year, the report says, and mechanical loading operations were up by 21.5 pct. A new production high of 53 million tons was set by wagon mines.

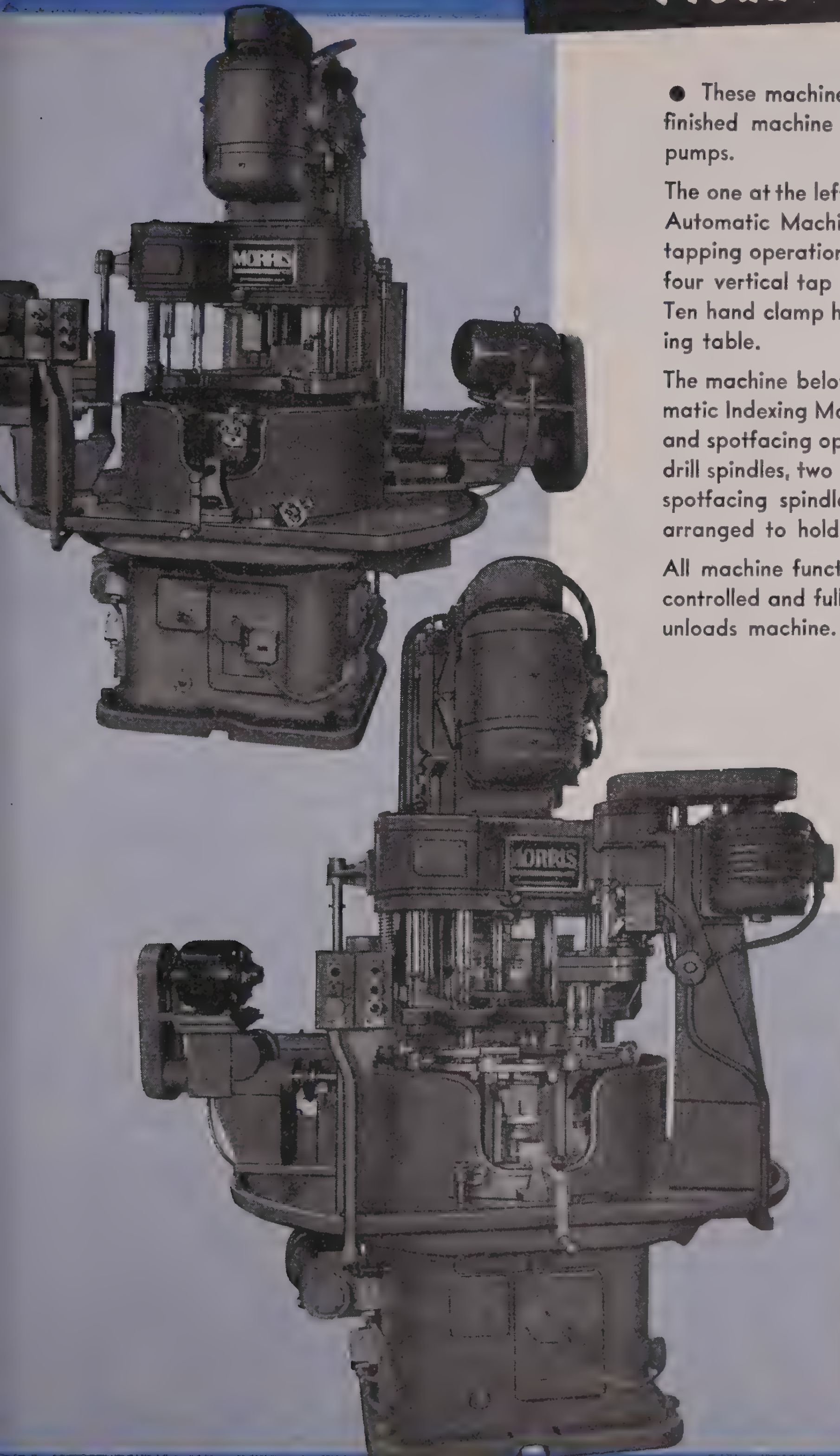
Greatest mining increase was noted in Kentucky with West Virginia, Illinois and Pennsylvania output also rising sharply. All major consumers used more coal except railroads.

Production per man increased from 6.3 tons a day to 6.43 and coal mining employment increased by 23,000. Exports rose 27 million tons to 69 million.

Average overall realization (f.o.b. at the mines) rose from $3.44 to $4.16 per ton.

PULLING FOR
IGH PRODUCTION —

MORRIS MOR-SPEED *Production Machines*



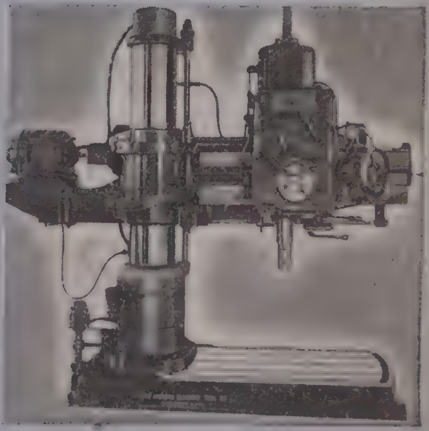
● These machines were designed and built for rough and finished machine operations on housings for automobile pumps.

The one at the left is a Morris Hydraulic Vertical 10-Station Automatic Machine for drilling, reaming, chamfering and tapping operations. It has twelve vertical drilling spindles—four vertical tap spindles and one horizontal drill spindle. Ten hand clamp holding fixtures are mounted on the indexing table.

The machine below is a Hydraulic Vertical 6-Station Automatic Indexing Machine for drilling, reaming, counterboring and spotfacing operations. It is equipped with four vertical drill spindles, two vertical reaming spindles and one vertical spotfacing spindle. Six hand clamp holding fixtures are arranged to hold the work.

All machine functions on both machines are hydraulically controlled and fully automatic—operator merely loads and unloads machine.

When your work requires multiple operations and high productivity consult Morris; they have the experience — engineering "know how" — and facilities to design — develop —and build high speed production equipment to meet your specific need. Write for details.



MORRIS MOR-SPEED RADIAL

Builders of
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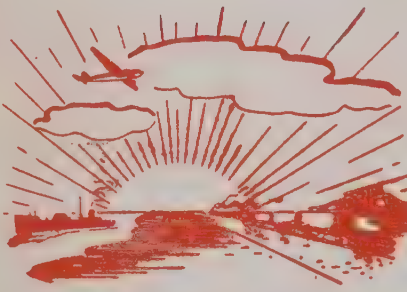
Line

The MORRIS Machine Tool Co.
CINCINNATI 3, OHIO

West Coast . . .

ROBERT T. REINHARDT

• Bickering between Columbia Steel Co. and some of its hopeful Utah customers for Geneva steel indicates that the honeymoon may be over . . . Electric power supply in West uncertain.



SALT LAKE CITY — The honeymoon aura which has surrounded relationships of Geneva Steel Co. and Utah fabricators is being contaminated by allocation and sales policies. Fabricators are beginning to complain publicly at what they regard as the company's unwarranted disregard for regional obligations. Some of the more resentful have started muttering threats of retaliatory action by use of the taxation weapon.

Top officials of Columbia Steel Co. have been asked by a committee of fabricators to come to Salt Lake City for a heart to heart talk. These are some of the complaints they are going to hear in an off-the-record session when they arrive.

(1) That the far - from - adequate allocations to local fabricating industries—some of which have been established since Geneva was purchased by U. S. Steel Corp.—were recently cut in half.

(2) That Utah is now getting only about 2½ pct of Geneva's production, whereas fabricators feel they are entitled to around 10 pct.

(3) That the presence of Geneva in the area prevents fabricators from getting steel from other sources because midwestern and Pacific Coast producers no longer regard this as a market under normal supply and demand conditions and they are therefore not interested in maintaining or building up market contacts. On the other hand, local fabricators charge Geneva is shipping east and west to take care of customers in competitive markets, leaving this area in a sort of no-man's land so far as steel supply is concerned.

That the allocation of structural shapes to local fabricators is so inadequate that they cannot even bid on nearby construction jobs against competitors in Kansas City and farther eastward.

Utah fabricators take the position that U. S. Steel Corp., by implied and expressly stated terms of its purchase agreement with the government, are obligated to operate Geneva with a view toward strengthening western industry. And unless the situation is improved (from their standpoint) their more or less private mutterings will probably grow into public screams.

"The industry," commented one irritated fabricator, "expects us fellows to fight against a severance tax in Utah. I have just about reached a frame of mind where I favor such a tax, with an exemption for raw materials used in the manufacture of steel which is fabricated within the state."

LOS ANGELES—Despite a dry November, California may get by without a power brownout this winter, but in the Pacific Northwest, things are darker, forecasts indicate this week.

Tightest squeeze in California is expected by the power companies around the twentieth of this month when short days will force early lighting of homes while many industries still are operating at peak loads.

A November which saw no rainfall in southern California and below average precipitation in northern California, has narrowed the safety margin below that anticipated this summer, but increased steam - generated kilowatt production by most major companies has made it appear that industry will be able to operate at full capacity as far as power is concerned.

A second possible "squeeze" is seen in February or March, by power officials, but this will be avoided if more rain falls in December and January so as to provide normal reserves in reservoirs.

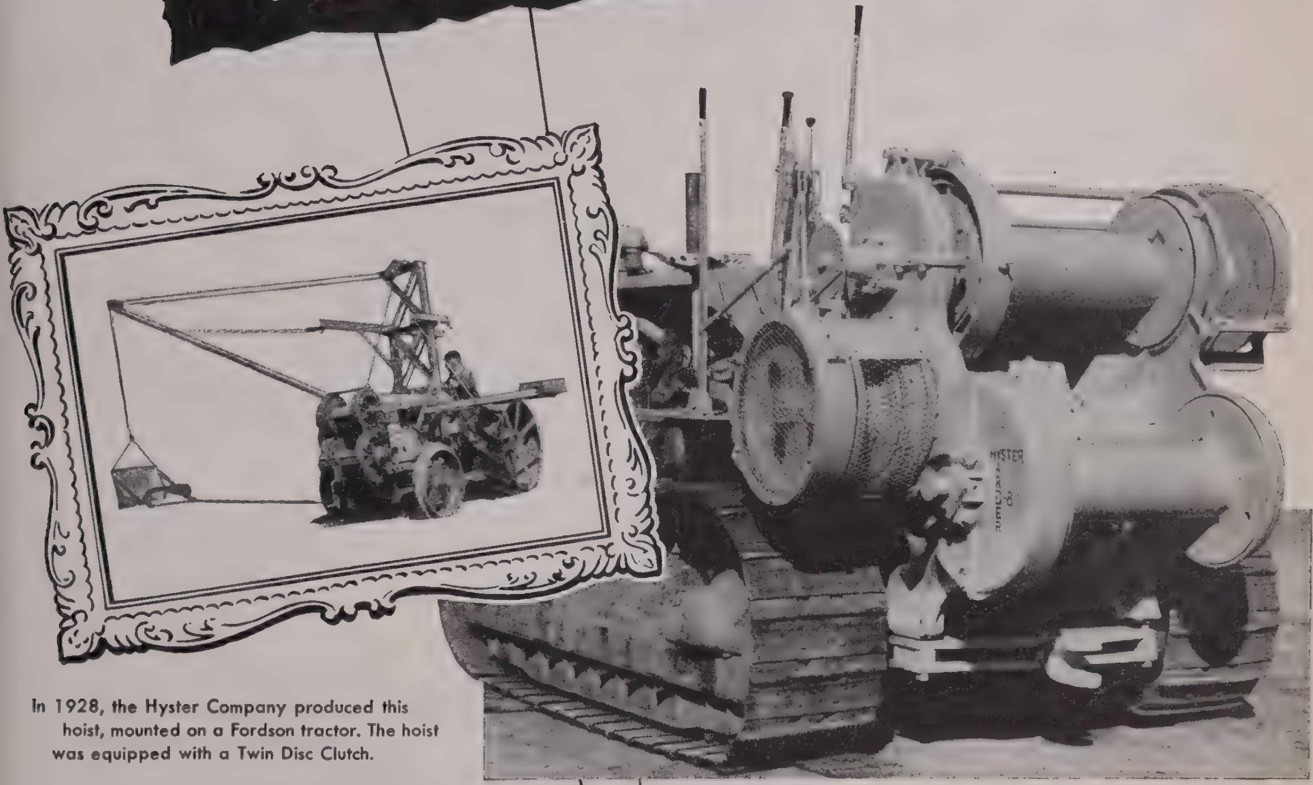
Officials believe that there is at least a 50-50 chance that California's "daylight savings time" will be removed at the next power conference called by Governor Warren early in 1949.

At the Southern California Edison Co. here, George N. Hawley, industrial sales manager, told THE IRON AGE that there now is sufficient power, or a large enough prospective capacity, so that almost any type of new industry could be located in southern California without influencing the shortage. "By the time a large plant could be completed our reserves through expansion will be great enough to handle this," he said.

In the southwest power area, which includes California, Arizona and Nevada, kilowatt capacity will have been increased by power companies from 5 million at the end of the war, to an estimated peak of 8.5 million in 1950. In 1945, the power facilities were such that 35 pct was generated by steam and 65 pct hydro power. By 1950, work under way indicates that the ratio will change to 45 pct steam and 55 pct hydro. The new hydro plants are being built on stable water forces such as the Colorado and Feather Rivers.

TYPICAL of the power facility increases recently completed are those of the Pacific Gas and Electric Co. in northern Califor-

Two Decades with Twin Disc



In 1928, the Hyster Company produced this hoist, mounted on a Fordson tractor. The hoist was equipped with a Twin Disc Clutch.

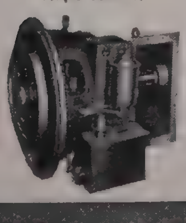
The current model Hyster D8 tractor yarder, mounted on a Caterpillar D8 tractor, also is equipped with a Twin Disc Clutch.

For more than twenty years, the Hyster Company has used Twin Disc Clutches on its yarders, winches, and other logging equipment. Like many other leading manufacturers of heavy-duty equipment for the lumber, construction, marine, petroleum, locomotive, farm implement, and machine tool industries, the Hyster Company has found Twin Disc Clutches efficient units for power transmission.

Twin Disc Clutch Company, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).

Heavy Duty Clutch

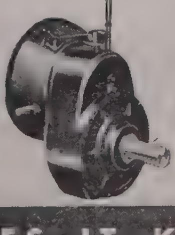
Hydraulic Torque Converter



Tractor Clutch

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

Reduction Gear



Marine Gear

JUDGE TWIN DISC BY THE COMPANIES IT KEEPS

nia where generating capacity installed since the end of the war totals 190,000 kw. Newest completed hydroelectric plant went into operation on the Mokelumne River, near Jackson last week to produce 16,000 kw. A 223,000 kw steam plant is scheduled for completion at Hunters Point, San Francisco in February. PG&E is reported as spending at the rate of $400,000 per day for new construction and by the end of 1948 total postwar investment in new power facilities will exceed $300 million.

Southern California Edison has just completed a 140,000 kw plant at Redondo Beach and will have a second 140,000 kw unit next year.

This company has increased its total output 9 pct annually since the war. During peak shortages, it exported d200,000 kw to the Pacific Gas & Electric Co. in the north and now is sending between 80,000 and 100,000 kw there according to Mr. Hawley.

Los Angeles Municipal Dept. of Power and Water is nearing completion of another plant of more than 150,000 kw.

In the Pacific Northwest the situation continues acute with all power users being urged to curtail or reduce operations, particularly during the peak hours of 4:30 and 6:30 p.m. The new Rainier Steel Corp. in Tacoma has had to sign a power contract with the Tacoma City Light Co. that will allow that company to shut off the steel mill's power during peak hours, and can permit the power company to suspend operations altogether if it deems it necessary.

ELECTRIC furnaces in Seattle have not as yet been affected although power companies do retain the right in case of emergency to curtail power during peak hours if it finds it desirable. Steel producers are cooperating by rearranging schedules so that electric furnaces do not operate during the peak periods.

In Portland the Northwest Utilities Conference Committee is urging voluntary curtailment of the use of power during the critical periods of 4:30 to 6:30 p.m. with only a modest degree of success according to reliable sources. Construction of small, private and municipal plants is being urged as a possible quick and temporary solution to the situation. If such plants are not built, little hope is held for the relief of the shortage until after completion of the McNary Dam in about six years.

Pacific Power & Light Co. is installing another generator at its Mewrin Dam and there is a possibility of another dam being built on the Lewis River and possibly another on the Cowlitz River.

Thus far there has been no effort to introduce "daylight savings" time in the Pacific Northwest as it is pointed out that Montana, Utah and a part of Idaho are already on a time basis one hour ahead of Washington and Oregon which tends to spread out the peak load and that advancing the clock in these two states would actually increase the load during peak periods.

ANOTHER MILESTONE: *Workmen at the Permanente Metals Corp's big rolling mill near Spokane are shown loading the 500 millionth lb of aluminum to be shipped from the plant since it began operations on July 12, 1946.*

Shipbreaking Nears End

Portland

• • • **That sad day** for steel producers in this area when shipbreaking ceases, moved one step nearer when the Salamaua was tied up at the dock of the Zidell Ship Dismantling Co. here as she is the last of 6 carriers to be scrapped by that company.

It has been estimated that this company has produced nearly 100,000 tons of scrap through shipbreaking operations in the 2 years it has been in operation. It is estimated that it will take about 6 months to completely wreck the Salamaua and unless other ships are put up for breakage this phase of the company's activities will come to a close.

Mustang Output to Begin

Seattle

• • • **Production of** the low priced Mustang automobile is scheduled to begin at Renton, Wash. sometime in January according to Roy McCarty, president of the Mustang Motor Car Co. and inventor.

Mr. McCarty states that he has developed a new technique for pressing full size automobiles from aluminum, thus making it possible to eliminate the necessity for a heavy investment in body stamps and dies. Thus far he has not revealed the technique to be used. (THE IRON AGE, Nov. 4, 1948, p. 142.)

Finance Smog Elimination

Los Angeles

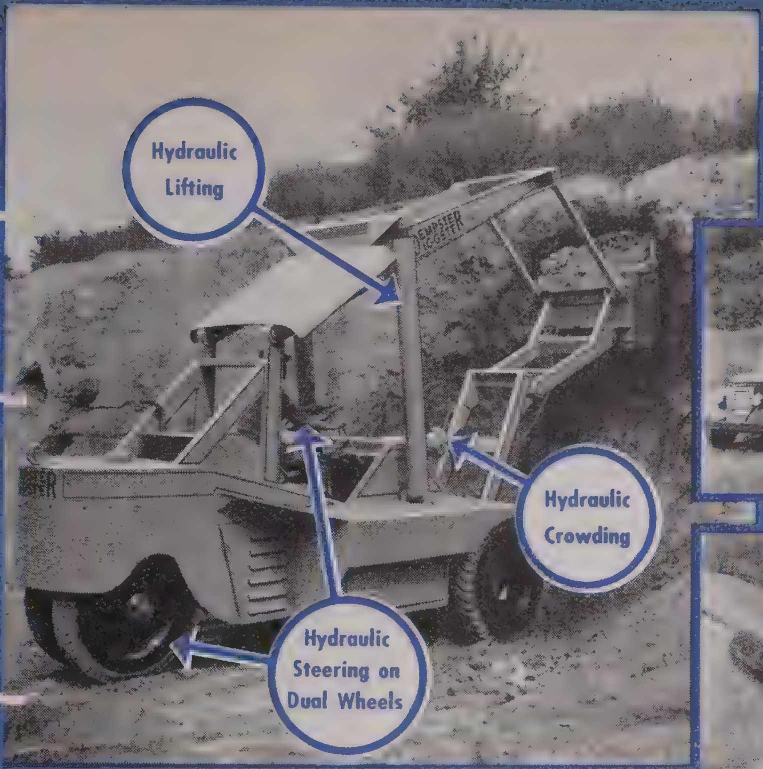
• • • **Industry cooperation** in an effort to eliminate smog costs money. Berg Metals Corp. is spending approximately $25,000 to install a baghouse of fiberglass bags to recover zinc oxide now emitted into the atmosphere, and Union Oil Co. which had a dust problem at its Cracking plant is building a centrifuging and water-scrubbing device at a cost of approximately $15,000.

Air Frame Employment Up

Sacramento, Calif.

• • • **California's air** frame industry now has 95,000 wage and salary workers according to a report recently submitted to Gov. Earl Warren. The postwar low for the industry was 87,000 employees in March of this year.

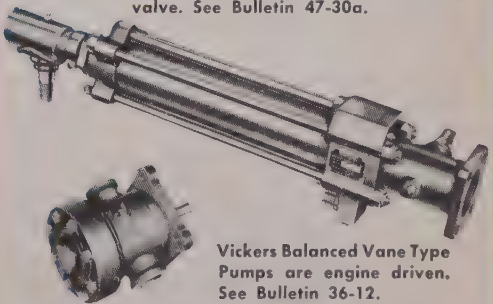
fast
mobile
easy to
operate



Dempster-Diggster

Has VICKERS
YDRAULIC CONTROLS

Vickers Improved Hydraulic Steering Booster with integral overload relief valve. See Bulletin 47-30a.



Vickers Balanced Vane Type Pumps are engine driven. See Bulletin 36-12.

Vickers "Multiple Unit" Valves include relief valve for overload protection. See Bulletin 40-13.

h speed versatility (as exemplified by the Dempster-Diggster) is racteristic of Vickers Hydraulic Controls.

ickers Hydraulic Power Steering Booster makes it easier to steer Dempster-Diggster over rough terrain, than a passenger car on alt pavement. Steering load is carried by hydraulic cylinder . . . by the driver.

ickers Balanced Vane Type Pumps supply oil under pressure also actuating cylinders that lift and crowd the dipper. These pumps exceptionally efficient and dependable: their exclusive hydraulic ance construction prolongs pump life by entirely eliminating pres-induced loads and consequent wear.

Overload protection for the machine is provided by relief valves gral with Vickers Steering Booster and Valves. Write for descriptive letins.

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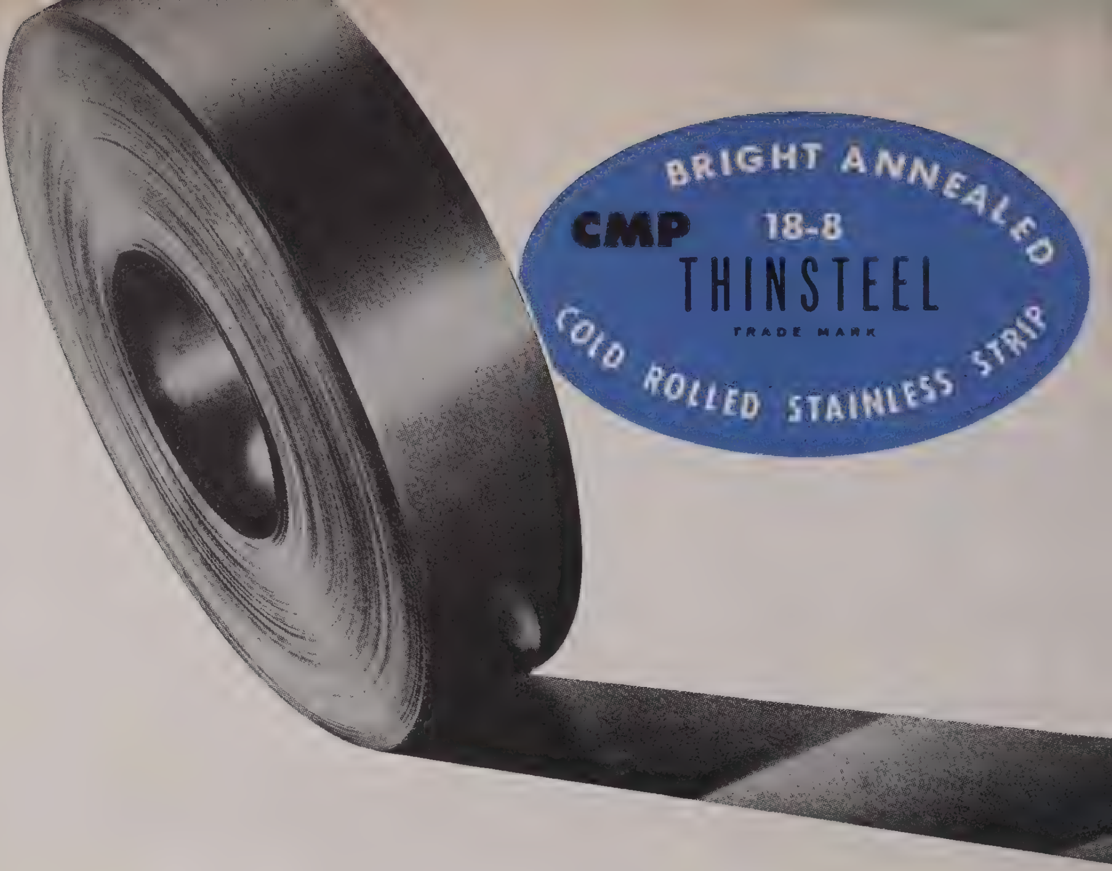
ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921



NOW YOU CAN HAV

in stainless steel strip

Manufacturers who use flat-rolled stainless steel can now enjoy many advantages in the form of lower fabricating and finishing costs and increased sales appeal through improved finish and corrosion resistance.

New CMP bright-annealed, chrome-nickel stainless Thinsteel offers the ideal combination of workability, attractive finish and corrosion resistance.

By using mill rolls made of Tungsten Carbide, a metal near diamond-hardness which takes and holds a high lustrous polish, a rich mirror-like strip finish is produced.

Where a soft temper is necessary, the mirror finished strip is then processed in CMP's exclusive bright annealing furnaces which anneal the strip while retaining the gleaming finish.

Available in many highly-corrosion-resistant chrome-nickel types and in gauges as thin as .001" this new CMP development offers many opportunities for cost reduction and product improvement.

At the same time, it makes the use of chrome-nickel stainless strip steel possible in many products where fabricating and finishing costs heretofore precluded its use. For example, some manufacturers have found that expensive polishing and buffing operations, always considered necessary, can now be reduced or entirely eliminated.

If you are using stainless steel strip in your product—or would like to—we would welcome an opportunity to show you how this improved Thinsteel will give it added usefulness, beauty and sales appeal with the possibility of important savings in production costs.

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- **EXTRA LONG COILS** *...less downtime*
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- **GAUGES THIN AS .001"** *...strength with lightness*

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the Cold Metal Products co.

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PERSONALS

• **Edward C. La Bart** has been appointed assistant district manager of the U. S. Steel Supply Co.'s warehouse in Seattle. Prior to his new appointment, Mr. La Bart had been located at the Los Angeles warehouse of the company and had previously been associated with Columbia Steel Co. **George R. Coffin** has been named assistant district manager of the U. S. Steel Supply Co.'s warehouse in Portland, Ore. He had formerly served as a salesman in the Chicago and San Francisco areas.

• **Joseph T. Simpson** has been elected president, Harrisburg Steel Corp., Harrisburg, Pa., succeeding **Wilbert Wear,** who has resigned. **H. M. Reeser** has been elected vice-president in charge of sales and secretary.

• **Kenneth R. Burchard** has been appointed head of the newly-formed Photomechanical Sales Dept., American Type Founders Sales Corp., Elizabeth, N. J. **DeWitt G. Manley,** formerly assistant to Mr. Burchard, is now manager of the new Offset Press Sales Dept.

• **George E. McLaughlin** has become associated with the Tube City Iron & Metal Co., Glassport, Pa., representing the company in the East and in the Mahoning Valley, with his headquarters in Youngstown, Ohio. Mr. McLaughlin had formerly been connected with Luria Bros. & Co.

• **Robert T. Maynard** has been appointed export manager, Thew Shovel Co., Lorain, Ohio. Mr. Maynard formerly served as district sales manager of the mid-Atlantic territory of the company.

• **Henry Gross** has been named manager of a newly-created nonferrous metals department of M. B. Speer & Co., Pittsburgh. Mr. Gross had formerly been purchasing agent and assistant secretary of Duquesne Smelting Co., division of the American Metal Co., Ltd.

• **A. W. Anderson** has been elected chairman of the board, Flint Structural Steel Co., Flint, Mich. **E. M. Christensen** has been named president and treasurer; **A. W. Sumney,** vice-president, and **D. M. Clinton,** secretary.

• **John C. Groffel** has been appointed district manager for the St. Louis territory by the Caine Steel Co., Chicago, succeeding Mr. Wolkind, who has resigned. Mr. Groffel has been with Caine for eight years in various capacities.

• **C. F. Seyler,** formerly assistant chief engineer, Jones & Laughlin Steel Corp., Pittsburgh, has been appointed manager of construction. Mr. Seyler has been with J & L since 1922, starting at the Aliquippa Works as design engineer.

ARTHUR F. PETERSON, vice-president, Bethlehem Steel Co., Inc.

• **Arthur F. Peterson,** formerly general manager of the mining division, has been elected vice-president of the Bethlehem Steel Co., Inc., in charge of the mining division, succeeding M. L. Jacobs, who died. Mr. Peterson joined Bethlehem in 1924 as superintendent of the Cornwall Mines and had previously been employed by Pickands, Mather & Co.

• **J. B. Scott** has been appointed quality control manager of Borg-Warner Corp.'s Ingersoll Steel Div. plant at Kalamazoo, Mich. He had formerly been associated with General Motors, Packard Motor Car Co. and the Chrysler Corp.

• **Malcolm Campbell** has joine
the industrial relations staff o
Great Lakes Steel Corp., Detroi
Mr. Campbell recently resigne
after seven years with the Palac
Corp., where he served as per
sonnel director.

• **B. H. Jones** has been appointe
vice-president in charge of sale
and **D. D. Greenshields,** vice
president in charge of productio
of National Screw & Mfg. Co
Cleveland. **G. F. Jenkins** has bee
named manager of industria
sales.

• **Gerald J. Klopfenstein** has bee
appointed to the newly-create
post of assistant to the vice-presi
dent and director of sales, Bowse
Inc., Fort Wayne, Ind. **James**
Doelling has assumed Mr. Klop
fenstein's former position as man
ager of the meter sales divisio
Mr. Klopfenstein has been wit
Bowser for the past 25 years an
Mr. Doelling joined the organiza
tion in 1937. Prior to his new as
signment, Mr. Doelling was man
ager of the sales engineerin
division.

• **Lewis B. Kinney** has been ap
pointed sales representative in th
State of Colorado for the Babcoc
& Wilcox Tube Co., Beaver Fall
Pa., maintaining his office in Den
ver. Prior to 1943 he was associ
ated with Carnegie-Illinois Stee
Corp. and later with LaSalle Stee
Co.

• **N. George Belury,** formerly di
vision vice-president, has bee
appointed president of the engi
neered castings division, Ameri
can Brake Shoe Co., New York.

• **Paul W. Hiller** has been ap
pointed manager of the newly
created products development de
partment, Innis, Speiden & Co
New York. Mr. Hiller formerl
served as special representative.

• **Frank R. Sowers** has bee
named vice-president in charge o
sales, Willard Storage Batter
Co., Cleveland, a newly-create
post in the company. Mr. Sower
has been with Willard since 191

• **Robert McFarlane** has bee
named general manager of Gib
Mfg. & Research Corp., Janesvill
Wis. Mr. McFarlane former
managed the B. F. Goodrich C
plant at Borger, Texas.

REAVIS T. CRAWFORD, purchasing agent, Baron Steel Co.

• **Reavis T. Crawford** has been appointed purchasing agent of the Baron Steel Co., Toledo. Mr. Crawford had formerly been associated with R. G. LeTourneau Co., Tennessee Coal, Iron & Railroad Co. and the Steel Div., War Production Board.

• **F. C. Berliner** has joined Maysteel Products, Inc., Mayville, Wis., as sales manager.

• **F. R. Fishback** has retired as chairman of the board, Electric Controller & Mfg. Co., Cleveland. Mr. Fishback joined the company in 1905. He became president in 1925 and board chairman in 1943. **A. C. Dyer**, vice-president and sales manager, has been elected to fill Mr. Fishback's place on the board.

• **T. W. Baush** has been appointed general export sales manager of all divisions of the Van Norman Co., Springfield, Mass., and the Morse Twist Drill & Machine Co., New Bedford, Mass. Mr. Baush has served Van Norman for 25 years, and has handled the export business for 17 years.

• **W. J. Reuscher** has been appointed comptroller of the Hudson Motor Car Co. Mr. Reuscher had formerly been associated with Bendix Home Appliances, Inc., and Firestone Tire & Rubber Co.

• **Paul W. Cotton** has been named management's representative in charge of industrial relations for Bethlehem Pacific Coast Steel Corp., San Francisco. Mr. Cotton has been affiliated with Bethlehem's Pacific Coast operations since 1938 in both Seattle and San Francisco.

• **A. S. Thaeler** has been appointed assistant marine engineer of Pittsburgh Steamship Co., Cleveland, a U. S. Steel subsidiary. Mr. Thaeler had formerly been acting chief engineer of Federal Shipbuilding & Drydock Co.

• **J. Gordon Knapp,** mechanical engineer, has become a principal of the firm of Palma-Knapp Associates, Chicago. Mr. Knapp formerly served as head of Aircraft Quality Div., Foote Bros.

• **H. G. Johnson,** who formerly represented the Standard Transformer Co. of Warren, Ohio, in New England, has resigned in order to assume the duties of New England manager for the I-T-E Circuit Breaker and Railway & Industrial Engineering companies.

• **Frank R. Kohnstamm** has been appointed senior vice-president, Jack & Heintz Precision Industries, Inc., and **Otto Hess,** general counsel and secretary of the company, has been named assistant to the president. Mr. Kohnstamm has only recently been elected vice-president. Mr. Hess continues his duties as general counsel and secretary in addition to those of his new appointment.

• **George W. Coultas** has joined the industrial engineering staff of Parker Appliance Co., Cleveland. Mr. Coultas has been associated with the consulting firm of Stevenson, Jordan & Harrison, with Reliance Electric & Engineering Co. and with Eaton Mfg. Co. in industrial engineering capacities.

• **Ralph W. Rager** has been elected vice-president of Oil Well Supply Co., Dallas, a U. S. Steel subsidiary. **Erwin P. Kraatz,** senior assistant controller, has been named controller, succeeding Mr. Rager, who served in that capacity since 1944.

E. CLYDE GRIMM, vice-president, Samuel G. Keywell Co., Inc.

• **E. Clyde Grimm,** formerly district manager of the Samuel G. Keywell Co., Inc., Pittsburgh, has been made vice-president of the corporation. Mr. Grimm continues in charge of the eastern district of Keywell.

• **Thomas M. Berry** has been appointed construction engineer, Contracting Div., the Dravo Corp., Pittsburgh. Mr. Berry had formerly been associated with the American Iron & Steel Institute in New York.

• **E. L. Sandberg** has been named assistant general manager of the South Wind division, Stewart-Warner Corp., Indianapolis. **T. M. Redmond** has been appointed plant manager. Mr. Sandberg, in addition to his duties as assistant to the general manager, retains his former responsibilities as controller or chief fiscal officer of the Indianapolis operations. Mr. Redmond, who recently served as head of aircraft heating equipment production, has been with Stewart-Warner since 1936.

• **Harry W. Strangman** has been elected treasurer and a director of Douglas Aircraft Co., Inc., Santa Monica, Calif., succeeding **Ralph V. Hunt**, who has resigned. **Fred C. Fischer** has resigned as industrial relations director for Douglas and has joined the Macy organization.

• **John W. Wilbur,** head of the department of civil and sanitary engineering at Massachusetts Institute of Technology, has joined the firm of Fay, Spofford & Thorndike, Boston, as consultant, particularly on structural engineering problems.

• **Henry M. Brundage** has been appointed manager of the automatic heating division of the air conditioning department of General Electric, with headquarters at Bloomfield, N. J. He formerly served as sales vice-president of Weber Showcase & Fixture Co., Los Angeles. **W. W. Kuyper** has been named divisions engineer of the turbine, generator and gear engineering divisions of the G-E River Works, Lynn, Mass., succeeding **K. M. Holt,** who is retiring after more than 40 years in service. Mr. Kuyper has been associated with the generator division and the aircraft gas turbine division at Muroc Dry Lake, Calif. Mr. Holt joined General Electric in 1908. **E. N. Twogood** has retired as division engineer of the gear engineering division. Mr. Twogood joined G.E. in 1910. **L. J. Collins** has been named to succeed Mr. Twogood. **J. J. Zrodowski** has been appointed designing engineer of the gear engineering division. He has been with the company since 1916. **George Carlson,** who formerly served as manager of engineering of the conduit products division, has been named manager of manufacturing of that division. **Robert L. Wakelee** has been named materials manager of the same division. He formerly served as supervisor of production and purchasing there and has been with G.E. since 1934. **Gordon H. Howes** has been named supervisor of general accounting for the construction materials department. An employee of the company since 1924, Mr. Howes formerly served as accounting supervisor in the appliance and merchandise department.

• **C. L. Beatty** has been elected executive vice-president of Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich. **W. R. Krepps, D. J. Vail,** and **L. K. MacGregor** have been elected vice-presidents in charge of production, in charge of manufacturing and in charge of sales, respectively.

C. H. HALLETT, manager of sales, Joseph T. Ryerson & Son, Inc.

• **C. H. Hallett,** assistant to the sales manager, has been appointed manager of sales at the Los Angeles plant of Joseph T. Ryerson & Son, Inc. Prior to his connection with Ryerson in 1941, Mr. Hallett had been associated with Inland Steel Co., Chicago.

• **A. W. Dunn** has been appointed manager of the Dayton office of Aviation Products Div., Goodyear Tire & Rubber Co.

• **Richard W. Schreck** has been named Michigan divisional sales representative for the Watson-Stillman Co., Roselle, N. J., working out of the company's Chicago office. Besides his duties in Michigan, Mr. Schreck acts as special consultant on hydraulic machinery for two of Watson-Stillman's representatives, the Frank T. Goetz Machinery Co. and W. K. Milholland Machinery Co. For two years prior to his association with Watson-Stillman, Mr. Schreck has been associated with the Hydraulic Press Mfg. Co. as sales engineer for that company's metalworking and plastic molding presses.

• **Stephen A. Foster** and **Gordon H. Collum** have joined the Philadelphia material handling sales department of Fab-Weld Corp., in Philadelphia. Mr. Collum had formerly been associated with Gates Rubber Co. in Denver and Mr. Foster had been connected with the Navy Dept.

• **Oliver McClintock** has been appointed assistant industrial manager of the Glidden Co., Cleveland. For the past 14 years Mr. McClintock has been associated with M. B. Suydam Div., Pittsburgh Plate Glass Co.

OBITUARY...

• **J. L. Replogle,** 72, chairman, Warren Foundry & Pipe Corp., New York, died Nov. 25.

• **Benedict J. Baker,** 63, former chairman of the board, Gamewell Co., Newton Upper Falls, Mass., Consolidated Machine Tool Corp., Rochester, N. Y., Eagle Signal Corp., Moline, Ill., Everlastik, Inc., Chelsea, Mass., and former director, Moore Drop Forging Co., Springfield, Mass., died Nov. 18.

• **Daniel H. Sullivan,** accountant, shipbuilding division, Bethlehem Steel Co., Inc., Quincy, Mass., died Nov. 19.

• **Austin W. Clark,** 53, treasurer-controller, the Carborundum Co., Niagara Falls, N. Y., died Nov. 21.

• **Hubert M. Rosencrans,** 59, assistant director of sales, Grasselli Chemicals Dept., Du Pont Co., Wilmington, Del., died Nov. 25.

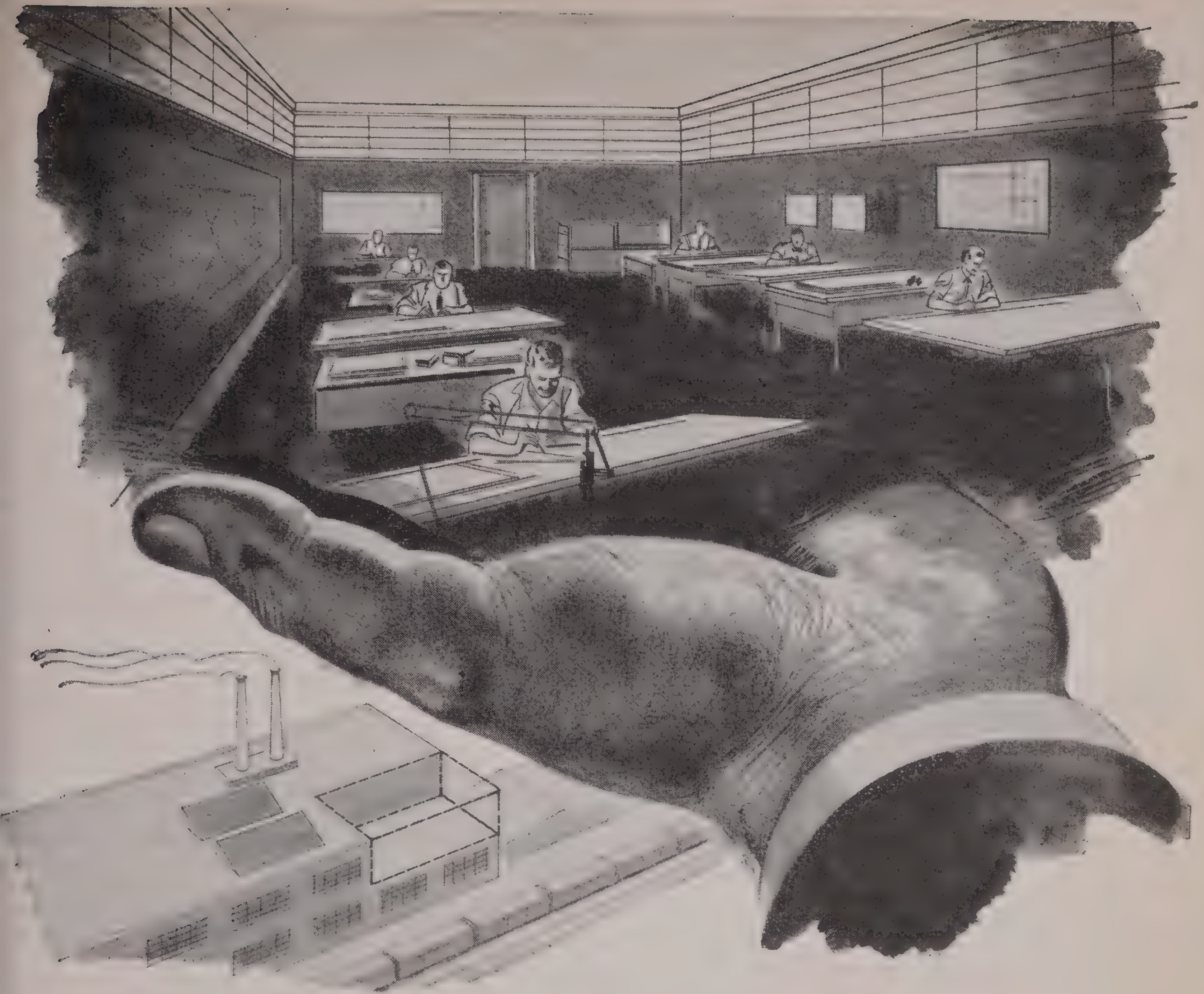
• **Horace C. Maddux,** sales manager, Trailer Axle Div., Timken-Detroit Axle Co., Detroit, died Nov. 21.

• **C. Edward Price,** president of Peninsular Grinding Wheel Co., Detroit, died Nov. 22.

• **James J. Lannon,** 70, president of Grant Gear Works, South Boston, Mass., died Nov. 22.

• **George E. Vinton,** 64, special representative of the Art Metal Construction Co., Jamestown, N. Y., died Nov. 21.

• **LeRoy A. Christian,** 74, president of Nash-Christian Foundry Supply Co., Birmingham, died Nov. 21.



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European Letter . . .

• Unrest and disintegration in southeast Asia traced to irresponsibility in commerce and industry, trade union weaknesses, foreign interests and rule . . . Future hopes lie in economic and social stability.

LONDON—The British officials who recently assembled in Singapore to discuss, under Mr. Malcolm MacDonald's chairmanship, the situation in southeast Asia have done so against a gloomy backcloth of violence, political unrest, economic distintegration and universal extension of Communist power and pressure. The situation seems all the more dangerous when it is remembered how frail and superficial are many of the links established between the western world and the Far East. The men who went out to trade in the nineteenth century had no very clear idea of their ultimate relations with the communities which, as a result of their intervention, were to be forced out of primitive or traditional patterns of society. Many of them assumed that a purely colonial status would prove permanent. Most of the rest worked on the assumption that it would prove possible, in time, to reproduce in Asia all the characteristics of western European democracy and to admit the peoples of southeast Asia to full equality of status. British and American theory conceived equality in terms of independence, French and Dutch of assimilation. But in both cases, the purely colonial relationship would be left behind.

At the root of the present crisis in southeast Asia lies the fact that none of these expectations has been fulfilled. In general, no eastern version of a fully fledged western economy has grown up. In large parts of southeast Asia, industry, such as it is, has remained in foreign hands. Commerce and banking has been shared between the westerners, the Japanese and the Chinese. Everywhere the base of the social pyramid has remained the peasant. Upon this basis, no strong middle class could be built. The peasants remained outside the political system. Trade unions were weak or non-existent. The officials and managers were European. Chinese traders, bankers and industrialists, both in their own country and in the lands to the southeast, showed more capacity for amassing fortunes than for exercising political responsibility.

THE consequence of these shortcomings was that in most lands in southeast Asia there was no basis for national equality with the western world, and the very factors which made western patterns inapplicable—the forgotten peasantry, the irresponsibility of the industrial and commercial classes, the weakness of the trade unions, and the prevalence of foreign interests and foreign rule—have played straight into the hands of the Communists, who are able to canalize into their movement both the economic grievances of the masses and the hatred of foreign rule felt by the more educated. Today, the sure outcome of the disappearance of western influence and control would not be independence or assimilation but absorption into the Soviet world.

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This is the situation which confronts the western Powers in southeast Asia. They can hardly be indifferent to it. But even if the issue is vital, can anything be done? One of the most discouraging features of the Nationalist débâcle in China is the impression it creates of a regime so inwardly weakened that no amount of outside assistance can shore it up. May not the failure of the west in the past to create the social pattern of western society mean that it is now too late to make the attempt? The western Powers can hardly accept such a verdict. Nowhere—not even in China—is the battle decided. It cannot, therefore, be abandoned. On present showing, however, it can be questioned whether it is being waged in the right way.

IN the first place, although the Communist threat presents an almost equal challenge to all the western Powers concerned with southeast Asia, there is little or no sign of them making a genuinely concerted effort to beat it back. On the contrary, to give only two examples, there have been very strong divergences of policy between the Americans, the British and the Dutch during the long-drawn out mediation in Indonesia, and a constant refrain of transatlantic criticism is that Britain is either doing too little, as in Burma, or too much, as in Malaya. The time for such disunity is surely past. The western nations most closely interested in the Far East are actively concerting their defense and economic policies in western Europe in order to give a firm and progressive answer to Soviet threats. Meanwhile Communism kicks open the back door and it is hard to say whether the Allies are even in agreement on the necessity of closing it again. Of a strategy for doing so, there is no trace.

It is one thing, however, to say that the door should be closed, quite another to know how it can be done. There is both an immediate problem—to hold the vast areas that are still under western control—and the longer-term, more fundamental problem of pacifying those areas and of permanently excluding Communist infiltration. There is no need for pessimism over the for-

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Consult your scrap dealer for advice on types, grades and sizes.

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Dismantle discarded equipment promptly into its components—electrical, fastenings, lumber, etc.—so that these parts may be utilized or scrapped.

Sort sweepings and miscellaneous waste to recover scrap values.

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mer task. It may still be possible to preserve southern and western China from the Communists, the Philippines are firmly under western influence, and almost everywhere else Communism is, temporarily at least, on the defensive as in Malaya and Indonesia or divided within itself as in Burma. A more vigorous defense policy can certainly enable the western Powers to hold the line. The real difficulties arise when they ask themselves what they intend to do behind it.

THE safest course, is surely, to return to the reasons which have led to the weakening of the western position. The west's failure is above all a social failure. It is this that the western nations must remedy if they are not to accept defeat. Hitherto, the policy of the western governments in the southeastern dependencies has been one of honest progressivism in political matters; it has taken a positive interest in commerce and finance; but it has tended to leave basic production to private agencies and the play of economic forces. This has led, until recently, inevitably but quite unconsciously, to a certain neglect of the basic element of the population, the peasantry. The peasant was too ignorant to provide raw material for experiments in responsible government, and too poor to be a major factor in commercial matters. In Malaya, this unconscious bias in western policy has had the further effect, now seen to be unfortunate, of favoring the Chinese and Indian elements of the population rather than the native Malay.

Possibly the first step to be taken in a new policy is to revise some of these emphasis, to found hopes for the future rather on economic and social stability than on political liberalism and to seek the stability of the social system at its base rather than at the top. There can be little doubt that the support and extension, throughout southeast Asia, of the land-owning peasantry could provide a more solid base for lasting cooperation with the west than the patronage of landlords who are no defense against Communism or of commercial classes who are often alien to the soil. No peasant will turn to a Communist party pledged beyond recall to collectivization (by the most brutal methods) if land for personal ownership can be had from another source. A policy of land reform is obviously beset with difficulties. For instance, in expropriating the existing landlords of southeast Asia, the authorities must pay compensation. Yet how is its burden to be borne? Similar problems of compensation are proving very difficult in Burma. Another set of difficulties is concerned with possible losses of wealth. If the extension of small peasant farms in Malaya, Indonesia and elsewhere in southeast Asia were to disrupt the plantation industries, the world would be gravely impoverished as a result. Of this, two things may be said. The first is that the damage done by the diffusion of ownership might be much less in southeast Asia than it has been in Europe. It is not certain, in rubber at least, that the big plantation is any more efficient than the small producer. Mr. P. T. Bauer, in the report on his investigation into small holdings in Malaya, which has just been published in the Colonial Office research series, expresses the opposite opinion. It may be that, for once, social and economic objectives march together. The second point is that a temporary fall in production, if it were moderate, would hurt the western world very much less than the permanent and total cutting off of supplies that would be the probable result of Communist domination.

A THRIVING economy in southeast Asia also requires an expansion of native industry—particularly of light industry. But industrial development will hardly contribute to the general objective of building a stable society, if it is left, as in the past, to foreigners. The British have started to find part of the answer in their efforts in Malaya to build up responsible trade unions and to introduce at least the first outline of social services. But trade unions cannot be responsible in a framework of irresponsible industrial management, and it is here, perhaps, that American experience can be of use. There is, perhaps, an example to be followed in the efforts that are now being made, largely under Mr. Nelson Rockefeller's leadership, to associate United States and Latin American capital on partnership terms. In time, no doubt, the United States side of the partnership may diminish, leaving behind businessmen capable of playing a constructive part in a modern democracy. There has been very little partnership in southeast Asia in the past. Full partnership may be impossible overnight; but it could at least be recognized as an objective.

If the western Powers are wise they will reinforce this policy by making full use of the economic organs of the United Nations. The World Bank, the FAO, the ILO can all be agencies of western policy provided the western Powers have the plans and the funds ready for the purpose.

IN these ways, the emphasis of western policy, which has been progressive in political matters and very hesitant in social and economic, could be reversed. But what does this mean in the political sphere itself? Independence in the old-fashioned sense entails the risk of Russian domination. But can independence be refused? To make it the goal of colonial policy has been one of the chief glories of the liberal tradition in the west, and it is only with the utmost hesitation and heart-searching that any retreat from it—or anything that might be interpreted as retreat—can be contemplated. Is it not more important to stress economic and social policies which will make eventual political independence a reality and not the mock of near-anarchy into which it is slipping in Burma today? It will admittedly be extremely difficult to persuade American opinion that alterations in the timetable of independence are in the best interests of both governors and governed and, again, it may be difficult to pursue economic and social improvement with enough energy and success to prove that the goal of independence is not abandoned, but simply postponed. Even so, the colonial timetable is not already so precise that a measure of caution cannot be injected into it. What is urgent is the immediate launching of new policies in the economic and social field. It is here that western policy faces its real test. In the next twenty years the western Powers can either lay the economic and social foundations of genuinely free communities in southeast Asia or they must watch the area slip, by penetration from within and pressure from without, into the Soviet sphere.

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• **NOT GUILTY**—Republic Steel Corp. pleads not guilty in the government antitrust suit filed against them and 19 other companies who are charged with restraining competition in the manufacture and sale of corrugated sheet metal and culvert pipe. They say that the practice complained of by the government in its proceedings have been standard in the culvert industry for nearly half a century. The sales contracts which were in existence between Republic and various culvert fabricating customers, to which the government takes exception, have all heretofore been canceled. Republic has no other relations with or interests in these customers except as a supplier of steel sheets. Republic has no intention whatsoever of acquiring control of any culvert manufacturer. The tonnage Republic supplies culvert manufacturers is only an infinitesimal part of Republic's output—about one quarter of 1 pct of its total business.

• **F.O.B. FIGHT**—First indication of unified effort to get congressional action to legalize delivered prices came from Pittsburgh where the first national meeting of the National Competition Committee was held Dec. 7 The single-purpose group includes a variety of industry members who are or may be affected by enforced F.O.B. mill pricing. The first local chapter, formed in Pittsburgh in September, has been followed by active chapters in Tulsa, Dallas, Houston, Cincinnati, Dayton, Cleveland and Philadelphia. The program is financed by membership dues ranging from $100 to $1000 per member.

• **CHOKING INDUSTRY**—Lowell B. Mason, nonconformist member of the Federal Trade Commission, says the FTC is getting its hands around industry's throat. He told a Pittsburgh audience, "We're not squeezing industry's windpipe or shutting off its wind but our hands are there nevertheless." He charges that the FTC reverses the American system in that it assumes industry is automatically guilty until proved innocent.

• **BOOM PACE**—National Tube's Lorain works is moving along at boom pace. Ingot production totaled 166,250 tons (based on a 30-day instead of a 31-day month.) Other records that the plant hung up simultaneously were: No. 5 skelp mill, 17,622 tons, previous high 17,416 tons; No. 2 butt mill, 12,626 tons, previous high 12,236 tons; and all butt mills 39,466 tons, previous high 36,974 tons.

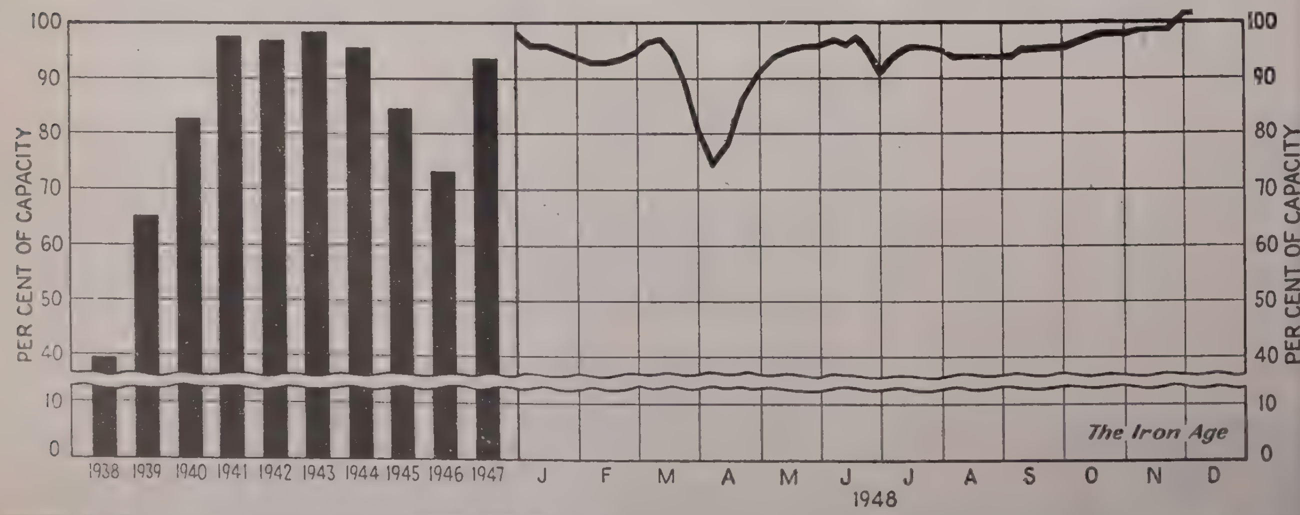
• **MUCH ADO**—There's much ado in the British steel industry these days—but not about nothing. The industry which is on its way to nationalization again established a record monthly production figure in November. Sir Stafford Cripps, Chancellor of the Exchequer originally set the 1948 steel goal at 14 million tons. As production mounted, the target was raised to 14.5 million tons. And that, too, is going to be exceeded. THE IRON AGE has estimated British production for the year to be 14.9 million metric tons, or 16.4 million net tons, a new war or peacetime high for steel output in that country.

• **HOT ROLLED EXTRAS**—Jones & Laughlin Steel Corp. can be added to the list of companies that have raised hot-rolled sheet and strip extras. The increases, in dollars per ton, made by J & L on Dec. 3 are: widths from 24 to 64 in., $2; over 64 to 72 in., $3 to $4; length, for cutting within standard tolerances, $2; pickling, formerly a flat 25¢ per 100 lb, has been boosted to 30¢ for 9 gage and heavier, to 40¢ for 10 to 13 gage and to 50¢ for 14 to 18 gage. These are increases of $1, $3 and $5 respectively, per ton on pickling. Heat treating extras were not changed.

• **BOILER TUBE PRICES**—Higher raw material costs have forced Babcock and Wilcox, principal nonintegrated producer of seamless steel boiler tubes, to advance prices 10 pct across the board. These higher costs came from some tube round price increases and purchase or manufacture of higher cost steel to meet customer demand. While the increases don't apply to all B&W's raw materials, the average cost rose enough to require the advance, a company spokesman said. Alloy steel extra increases announced in October may also be soon passed along to consumers in the form of higher alloy steel boiler tube prices.

• **SECOND INSTALLMENT**—The United States has authorized a second $5 million loan to the Steep Rock Iron Mines, Ltd. of Canada for which we are expected to receive imports of high grade iron ore exceeding 3 million tons annually. For the first $5 million wartime loan in 1942, the U. S. received almost all of the 3.5 million tons of ore resulting from the new development. The new loan is to bear 4½ pct interest. Total indebtedness is to be secured by a first mortgage on all company property and is to be repaid in annual installments ending in 1960.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
Nov. 30........	98.5*	100.5*	94.0	98.0	104.0*	105.0	102.5	102.0	100.0*	109.5	103.0	89.5	98.0*	100.5
Dec. 7..	99.0	99.5	94.0	98.0	103.5	105.0	103.5	99.0	102.0	106.0	107.0	89.5	102.0	100.5

* Revised.

Industrial News Summary

- *Appliance Sales Shrink in Midwest*
- *In Other Areas Demand Still Strong*
- *Steel Is Still "Money in the Bank"*

A SHRINKING of home appliance sales volume in the Midwest has been taken by some manufacturers as more than a straw in the wind for that industry. So much so that a few Chicago area people are talking about cuts in conversion of steel and withdrawal from the gray market. So far the number of companies who have cut conversion plans is not large. But Midwest appliance makers are anxiously watching Christmas sales. If they are heavy no more changes will be made. If they are less than expected, less steel via the higher priced route will be purchased.

While Midwest makers were worrying, the same could not be said for Detroit, Pittsburgh and Eastern appliance makers. Whether these people were whistling in the dark remained to be seen. Most of them said they would continue to need as much steel as they have been getting. The mere whisper that they might not want the same amount of steel would lay them in the aisles.

A check on a few of the larger manufacturers disclosed that if washer, high priced refrigerator, ironer and sweeper markets were jammed, the steel would be used to produce cheaper refrigerators, other types of appliances and accessories which were not being made because of the steel shortage. They also pointed out that some accessories now being made of steel substitutes could be made much better with steel.

Steel consumption figures show that about 1.7 million tons of finished steel will be used this year in the manufacture of all appliances. If all appliance making were to stop cold, the amount of steel involved would be a small part of total steel shipments. Also the stampede by other steel users for that amount of steel would probably maim or badly cripple some people in the rush.

APPLIANCE sales have been closely watched because some steel officials believe that they might be the first weather vane indicating a more orderly steel market. Most hope that this will come about. There is no weeping in steel circles over the possibility that conversion deals might be slipping and that the gray market is contracting. But they have to see this first before their spirits rise.

So far as can be determined, no other large users of steel are getting what they want. Nor can it be said that appliance makers as a whole agree with Midwestern views on the permanency of the decline in sales and the consequent building up of inventories. They admit that their turn to believe that way may come sooner than they expect.

While the question of the significance of weaker markets for soft goods lines made from steel continues, other steel customers are afraid that: a fourth round of wages, the adverse outlook in foreign affairs, and the knowledge that the administration would not stand for large unemployment will keep up inflationary trends.

If that be true, then any steel on hand is money in the bank. Also some steel users are afraid to give up any steel they might have coming to them—even if they don't need all of it—because it would mean someone else would get it. And that someone else might be a better guesser. It is all very confusing to the maker as well as the user of steel.

Current reports on steel demand show no decrease in orders at steel centers. Sales people say that each week they get letters from large users of steel pleading for more tonnage.

IT is a safe bet that if the railroad freight rate hearings now going on result in another rate increase on steel products, buyers will put even more emphasis on trucks. That emphasis is even now growing. When the Interstate Commerce Commission made final its decision on the most recent rail rate increases last August the radius of economical truck shipments soared from about 350 miles to about 500 miles.

The railroads are seeking a 13 pct increase in the territory where most steel products move. They want to boost ore rates by 35¢ a gross ton and coal and coke by 40¢ a gross ton. The latter are a positive threat to steel prices.

Truck shipments of steel sheets from Pittsburgh to the major manufacturing districts of Michigan last August were more than twice what they were in August 1947. Nationally truck shipments of iron and steel products were 22.9 pct higher in September 1948 than they were in September 1947. The reason was twofold, however, and not all can be laid to higher rail rates. The other reason was the shortage of freight cars. Steel executives have pointed out that the car shortage has caused them loss of shipping turns. This is not only inconvenient but expensive.

Steel ingot output this week stays as 100.5 pct of rated capacity. No important change is expected in weeks to come.

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Iron and Steel Exports Will Be Reduced 2 Million Tons This Year

Controls Have Been Effective But Have Made Hardships On Many Exporters

By BILL PACKARD
Ass't News-Markets Editor

New York

• • • **Exports** of iron and steel products this year will total about a third less than last year. Total exports last year were slightly more than 6.5 million tons. The final figure this year will be less than 4.5 million tons. This includes Marshall Plan shipments. Startling, isn't it?

This comparison is especially significant when one recalls all that has been said and written about the impact of Marshall Plan requirements. Have these requirements been smaller than had been anticipated? Has foreign fervor for American steel cooled? Have dollar shortages forced foreign consumers to withdraw from the market? The answer to all these questions is "yes."

These factors have all contributed to the shrinking iron and steel export business. But they are insignificant compared to export controls—the real denominator of steel sales abroad. Export controls, administered by the Office of International Trade of the Dept. of Commerce, have made the difference.

Controls were deemed necessary because of serious shortages of goods in the U. S. as well as in other countries. They were designed (1) to prevent inflation resulting from customers bidding up the price of these scarce goods, (2) to keep essential commodities in this country, and (3) to see that things which we can spare go to countries which need them most.

OIT has done what it was supposed to do. It has almost completely squelched a thriving gray market in export steel (estimated in 1947 at 2 million tons). It has channeled the steel exports where it wanted them to go. It has kept steel essential to the domestic economy in this country. It has done these three things far more effectively than many people thought possible. This has been possible because its controls are iron clad.

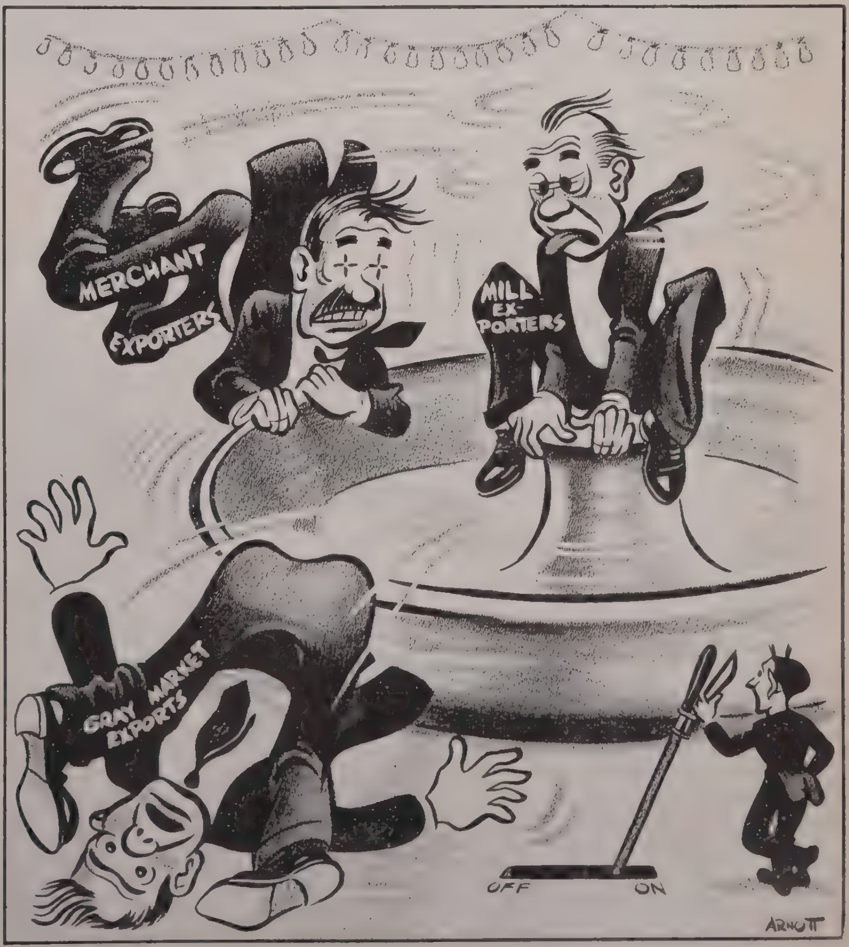
The job has not been an easy one. It has been costly to some. It has been frustrating and aggravating to all in the export business. This is the cost of controls.

OIT is lord, judge, and sometimes executioner, of steel exporters. Liquidating steel exporters is not the intended function of OIT. Far from it. Its intended function is simply to control exports. The demise of some firms has merely been an unhappy consequence of these controls—the cost of controls.

The onerous and complicated steps in obtaining an export license have weighed heavily on mill and merchant exporters alike. Business men can be expected to fret and chafe under any kind of controls. The stronger are the controls, the louder is the yammering. But in addition to their inherent dislike of controls there is preponderant evidence of real hardship.

Merchant exporters protest that they have been unfairly discriminated against by OIT. Undoubtedly they have fared worse than mill exporters. But this ap-

OIT's Export Control Machine!



pears to be true because they have had a harder time complying with the licensing procedure. If there has been discrimination, it appears to have been inadvertent.

What are the hardships resulting from licensing procedure? The loudest gripe is the oldest. It is time. Every exporter the writer contacted complained about the long period of sweating it out before he learned whether his application was approved, rejected or returned without action.

This squawk is just. Before the exporter's application for license is submitted he has already gone to a lot of time, trouble and expense. He has had to provide evidence of (1) a reputable source, (2) a firm order and (3) end use of the product. Even before that he has had to check quotas against potential customers.

It is no wonder that he resents the long waiting period before he learns what has happened to his application. He will be glad to cite you a number of examples of what he honestly feels are unreasonable delays — of applications immobilized by a snarl of red tape—of static periods before moving from one desk to the next.

Opinion is divided as to what can be done about this. Some feel that OIT should further streamline and speed processing of applications. Others say that it is just the price of controls. That nothing can be done about it—except to throw the whole system of controls into the garbage can.

None of them think this will happen. They believe that export controls will be extended when the matter comes before Congress in February. A surprising number of them believe that they will continue to the end of the Marshall Plan.

Quotas of specific products during certain periods have not been entirely taken up. Asking an exporter about this is likely to bring on a real explosion. "Sure, we know about it. But what can we do about it? We never find this out until it is too late to get an application processed."

The bigger companies who can afford to keep license expediters in Washington have fared best. This is true because the expediter can make on-the-spot corrections and revisions in applications. This saves valuable time. In some instances it means the difference between getting the application approved and throwing up hands in sign of disgusted failure.

Exporters say that dollar shortages in foreign countries also make it difficult to do business. These dollar shortages are real. But foreign consumers are also playing poor man. They want the steel they buy to be paid for with Marshall Plan dollars.

PREFABS FOR EXPORT: *Britain has added another industrial product to its list of dollar-earning exports. Their aluminum prefabricated houses will soon be seen in South America, India, New Zealand and Australia. Modern mass production methods are used by A. W. Hawksley's* 3000 *employees to turn out a complete house in* 15 *min.*

Requests Approval For 650-Mile Gas Pipeline

Washington

• • • **Mississippi** River Fuel Corp. of St. Louis has asked Federal Power Commission approval for construction of additional facilities including a 650-mile gas pipeline from Louisiana into Illinois.

Designed for completion by 1954, the project would require approximately 120,000 tons of 26-in. pipe. First step in construction would be the laying of about 38,000 tons of pipe over a 205-mile stretch in Illinois.

Gray Iron Men Elected

Cleveland

• • • **A Central Ohio** management executives group of Gray Iron Founders' Society has been organized in Columbus, Ohio, at a meeting at which M. B. McKee, Gartland Haswell Co., Sidney, Ohio, presided.

Marshall B. Dewey, general manager, Miller Foundry Co., Columbus, was elected chairman of the newly formed group and George H. Alten, Alten's Foundry & Machine Works, Lancaster, Ohio, was made chairman of the membership committee.

Scrap Men Choose Officers

St. Louis

• • • **At a recent** meeting of the St. Louis Chapter of the Institute of Scrap Iron and Steel, the following officers were elected for 1949: Samuel I. Lefton, B. Lefton & Sons Iron & Metal Co., St. Louis, president; Charles Forcheimer, Jack R. Forcheimer & Sons, St. Louis, first vice-president; Sidney Grossman, Grossman Iron & Metal Co., Inc., St. Louis, second vice-president; and Sol Mack, Frank Mack Co., Edwardsville, Ill., third vice-president.

ODT Criticism Of Freight Car Building Program Called Unfair

○ ○ ○

By GEORGE F. SULLIVAN
Pittsburgh Regional Editor

○ ○ ○

BUILDING R. R. CARS: *Here the center sill advances to be fitted to the trucks. Additional parts are added in this fitting position. The embryo car then moves forward on its own wheels to the next position for riveting. This will complete the underframe and truck assembly.*

Pittsburgh

• • • **Steel officials** working on voluntary allocations privately feel that recent Washington criticism of the 10,000 freight car a month program is unfair. Particularly so because they have just gone out of their way to set up mill space reservations for carbuilders who didn't have orders to back them up. The criticism was contained in a letter sent out on Nov. 27 by Col. J. Monroe Johnson, Director of the Office of Defense Transportation. It went to steel companies, carbuilders, railroads and some government agencies.

The feeling in steel circles is that there is no sense talking about more steel for more cars until the railroads increase their orders. Carbuilders queried by THE IRON AGE agree. For obvious reasons they won't say so publicly.

Steel men have not taken a negative attitude. Feeling that some of the car shops that had no orders for February and March construction might get some before the steel had to be rolled they reserved space on the mills for the carbuilders. The understanding is that if car orders are not forthcoming the builders will cancel before the steel is ready for rolling.

The plan is working. Several carbuilding shops have already received orders which have been placed against their reserved tonnage. To the builders the reservation arrangement means they won't have to cut operations for lack of steel if the railroad orders come in a little late. To the mills it means they can schedule their orders in a little more orderly fashion without the disruption of late orders which they might feel obliged to push through. Either that or they would be hurting a program in which they are vitally concerned, through no fault of their own.

As big users of cars for incoming and outgoing shipments the steel companies have a stake in the carbuilding program. Last July steel company executives asked William T. Faricy, president, Assn. of American Railroads, if gondola car production could not be stepped up. Mr. Faricy subsequently recommended to the carriers that 60,000 gondolas be added to the 18,000 on order then.

The reasons cited to Mr. Faricy by the steel officials were the inconvenience, expense and loss of shipping turns which the gondola shortage was causing in steel mills. In a memorandum dated Nov. 22, Col. Johnson asserted that the steel people had countered a request for more steel for the additional gondolas with the suggestion that other type car building be cut back to permit heavier concentration on gondolas. The steel men said that otherwise they would have to cut back other customers.

Colonel Johnson prefaced this memorandum with a letter to members of the Steel Products Advisory Committee who had met in Washington on Nov. 19. In it he said that because his remarks at that meeting had been cut short he had been unable to express his gratitude and apprecia-

Industrial Briefs . . .

• **NEW COMPANY**—James W. Dice, formerly assistant sales manager of Sperry Products, has announced the formation of a new sales and development organization to be known as J. W. Dice & Co. at Grand View-on-Hudson, N. Y. The new company will specialize in the marketing of industrial and laboratory nondestructive test instruments.

• **AWARDS CONTRACT**—The Kennecott Copper Corp. has awarded a lead construction contract covering the installation between 5 and 6 million lb of sheet lead, lead pipe and other lead apparatus at its new refinery at Garfield, Utah, to the Andrews Knapp Construction Co., Inc., of New York.

• **CANADIAN AGENT**—Hugh Russell & Sons Ltd., of Toronto and Montreal, is the newly appointed exclusive distributor for American Cladmetals Co., Carnegie, Pa., in Canada. It will handle the Rosslyn Metal which has a copper core and stainless steel surfaces.

• **CHANGE OF ADDRESS**—Hanover Steel Corp. has announced the new location of its plant and offices at Lehigh Ave. in Union, N. J.

• **PARKER DISTRIBUTOR**—Johnson-Sperry Co., Middlefield, Ohio, has been appointed distributor in southern Ohio for O-rings for hydraulic and other sealing applications, manufactured by Parker Appliance Co., Cleveland.

• **NAMED TO PEI**—R. A. Dadisman, manager of Armco Steel Corp., Market Development Div., has been elected vice-president of the Porcelain Enamel Institute. He was also named to the board of trustees and will serve on the executive committee.

• **AIME MEDAL**—Eugene McAuliffe, recently retired chairman of the board of Union Pacific Coal Co., has been awarded the Erskine Ramsay Gold Medal by the American Institute of Mining & Metallurgical Engineers. The medal is awarded in recognition of distinguished achievement in the production, beneficiation or utilization of bituminous or anthracite coal.

• **MOVES**—The Adamas Carbide Corp., producers of standard and special tool tips, dies, and wear parts, has moved to 1000 South Fourth St., Harrison, N. J.

• **PURCHASE**—Airquipment Co. has announced the purchase of Aerol Co., Inc., Los Angeles, manufacturers of materials handling equipment and developers of a watertight wheel. Aerol will continue as a separate entity under its own name as a subsidiary of Airquipment Co.

• **ELECTS OFFICERS**—Herman Caplan, of M. W. Singer & Co., Pittsburgh, was elected president of the Pittsburgh chapter of the Institute of Scrap Iron & Steel, Inc. Samuel M. Goldberg, of Pennsylvania Iron & Steel Co., Pittsburgh, was named vice-president while Paul H. Stocker, of H. F. Stocker & Co., Pittsburgh, was elected secretary.

• **TAKES OVER**—Worthington Pump & Machinery Corp. has announced that manufacturing and distributing activities of its subsidiary, Ransome Machinery Co., will be conducted by the parent corporation at the same location in Dunellen, N. J.

• **OPENS WESTERN PLANT**—A $3 million motor manufacturing plant, which at peak production will be able to turn out more than 1500 electric motors weekly, was recently opened by the General Electric Co. at San Jose, Calif.

tion to the steel people for their actions in helping to make his efforts "to some degree effective, actions that have prevented the car shortage from becoming a disaster."

In his more recent letter of Nov. 27, Colonel Johnson took issue with the OIC for not plugging for 12,000 or 14,000 cars a month. He charged that the admitted goal—ownership of 2 million cars by Class I railroads—was 23 years away at the 10,000 car a month rate.

He pointed out that the President's Committee on Foreign Aid (the Harriman Committee) had, in November 1947, recommended 12,000 cars a month as a rock bottom goal. Other government groups, including the Munitions Board, had set minimum figures of 12,000 or 14,000 cars a month, Colonel Johnson showed.

Steel people are not arguing about the various goals above 10,000 cars a month. They do take issue with Colonel Johnson on the need for steel as the freight car order picture looks now. Specifically, they can't agree with the next to last paragraph in Colonel Johnson's Nov. 22 memorandum. **There the ODT** Director asserts that there are now enough orders to occupy the builders of freight cars for the next 12 months if not another car were ordered. From their talks with carbuilders, steel people conclude that this is not accurate. A check made last week by THE IRON AGE indicates that no carbuilder has enough orders to run for 12 months at current rates. A few shops of two of the larger companies have heavy backlogs but these companies as a whole do not have 12 months' business on their books. Many of the others in the industry have only 4 to 5 months' backlog. Some haven't quite that.

The allocation of more freight car steel will come to a head if railroads step up their orders substantially. Then a decision will have to be made. Until then steel sources see the argument as purely academic. There is some reason to believe the railroads may place larger orders soon. Meanwhile, though they ordered 4852 cars in November, their average orders for August, September, October and November totaled only 5228 cars.

Little Improvement Expected in 1949 Machine Tool Business

Industry Is Operating At Low Level and Also Gradually Losing Trained Men

° ° °

By BILL LLOYD
Cleveland Regional Editor

° ° °

Cleveland

• • • **Undaunted by** a number of variable factors, including ECA, which could easily mean success or failure for the machine tool industry in 1949, spokesmen for mid-western segments of the industry predicted this week that the machine tool business in 1949 will be about as good as in 1948.

Preliminary estimates of 1948 business suggest that the industry will probably finish up with orders approximating $275 million and shipments of $290 million.

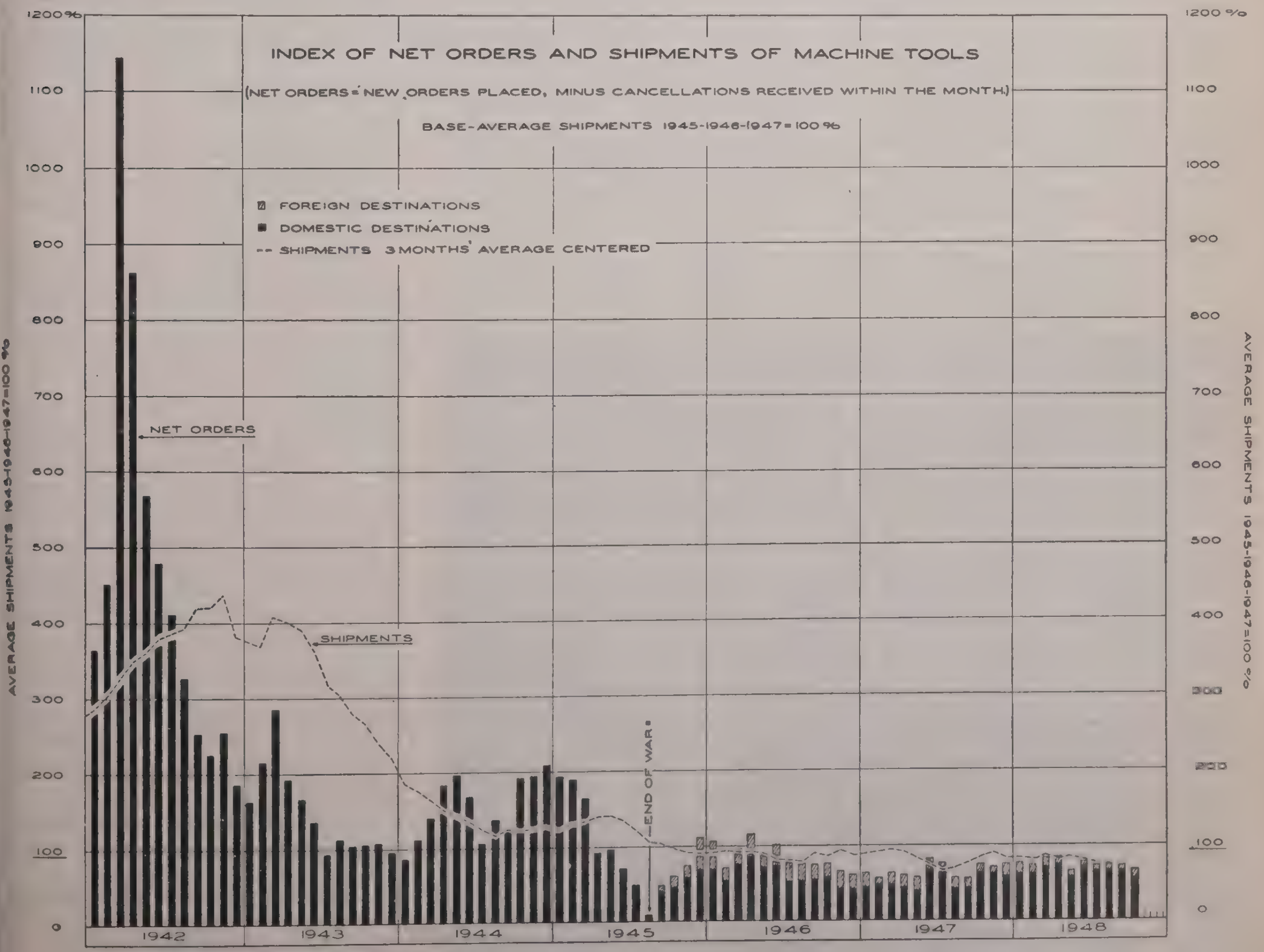
A spot check of a number of mid-western machine tool companies by THE IRON AGE brought forth the following comments:

L. D. McDonald, president, National Machine Tool Builders' Association, and vice president, Warner & Swasey Co., Cleveland, said the industry's overall business volume in 1949 will be about the same as 1948, but added, "there is nothing in the picture to give much of a fillip.

"The industry is operating at a low level and losing trained men," he asserted. "In fact, the industry is slowly starving to death while European countries are rebuilding their machine tool industries at the expense of time.

"This is not to be construed as a complaint, nor a criticism of ECA, but some control should be exercised over the allotment of ECA funds. British machine tool deliveries are extended to 18 months to two years, while machine tool companies in this country can make immediate shipment. The loss in production and employment for 18 months or longer would seem to more than offset any possible price differential between U. S. and foreign machine tools."

The recent presidential election should not seriously interfere with the sales outlook for the



DATA ON ORDERS FOR FOREIGN DESTINATION NOT AVAILABLE FOR 1942 THROUGH AUGUST 1945 machine tool industry for 1949, according to F. C. Chapin, president, National Acme Co., Cleveland.

"Capital won't be quite as free," he asserted, "but ECA business for machine tool builders should materialize by the second quarter, which will give the industry a backlog to work on."

He expects little business from the defense program, pointing out that there are many machines available for defense work, in either government stocks or standby plants. He added, "If they only knew what they had—machines are available."

Mr. Chapin said that with the 40 pct inflation, manufacturers are catching up with producers goods, and when demand is completely satisfied, prices become stalemated and emphasis switches to lower costs, which will permit lower prices.

During 1949 Mr. Chapin foresees a continuing market for high production machines that will substantially reduce costs. He said that Germany, potentially, at least, is a promising market, if for no other reason than that the Germans do not need to be educated as to the use of high production tools.

Mr. Chapin added that if the Germans were permitted to regain some semblance of national unity, under supervision, capital would be available to finance new production equipment. Investors know that Germans are good industrialists, and capital will go where there is confidence in the management, Mr. Chapin said.

In Chicago, A. G. Bryant, president of National Machine Tool Builders Association last year, president of Bryant Machinery & Engineering Co., and a vice president of Cleereman Machine Tool Co., Green Bay, Wis., believes there are so many factors that must first be appraised, including several things that will definitely have an effect on total sales volume, that any estimate is open to serious question.

"First is the foreign business from ECA. Already we are fairly well assured of $56 million by July, according to allotments already achieved, and there may be additional business from this source.

"Another thing that must be considered are appropriations for the second half of 1949. Such appropriations could be as much as the first half, or about $50 million. There alone you have a variation of $50 million in your estimate," Mr. Bryant stated.

"Another important factor is the defense program—how extensive will it be, how many machines will be required. This business is negligible as yet.

"Still another factor to consider is the automobile industry—how much tooling will there be in 1949.

"My own general feelings are not pessimistic about the outlook for 1949," Mr. Bryant emphasized. "There is need for production, therefore there is need for machine tools.

"We will be adversely affected by taxation and other elements, but adding it all up, we will have a year not much different from 1948, nothing worse, nothing better."

Indicative of the broad divergence of opinion on the 1949 outlook among professional economists, and pertinent to any estimate of 1949 industrial activity is a recent article by Russell Weisman, well known economist and *Cleveland Plain Dealer* columnist, taking issue with Ewan Clague, government economist attached to the bureau of labor statistics.

Mr. Clague is of the opinion that no general collapse in prices is in prospect, but some decline in industrial activity might be expected, but that depression was not in the picture.

"When in this business one hears an opinion of this kind expressed, he is interested not so much in the point of view as in the supporting data," Mr. Weisman wrote.

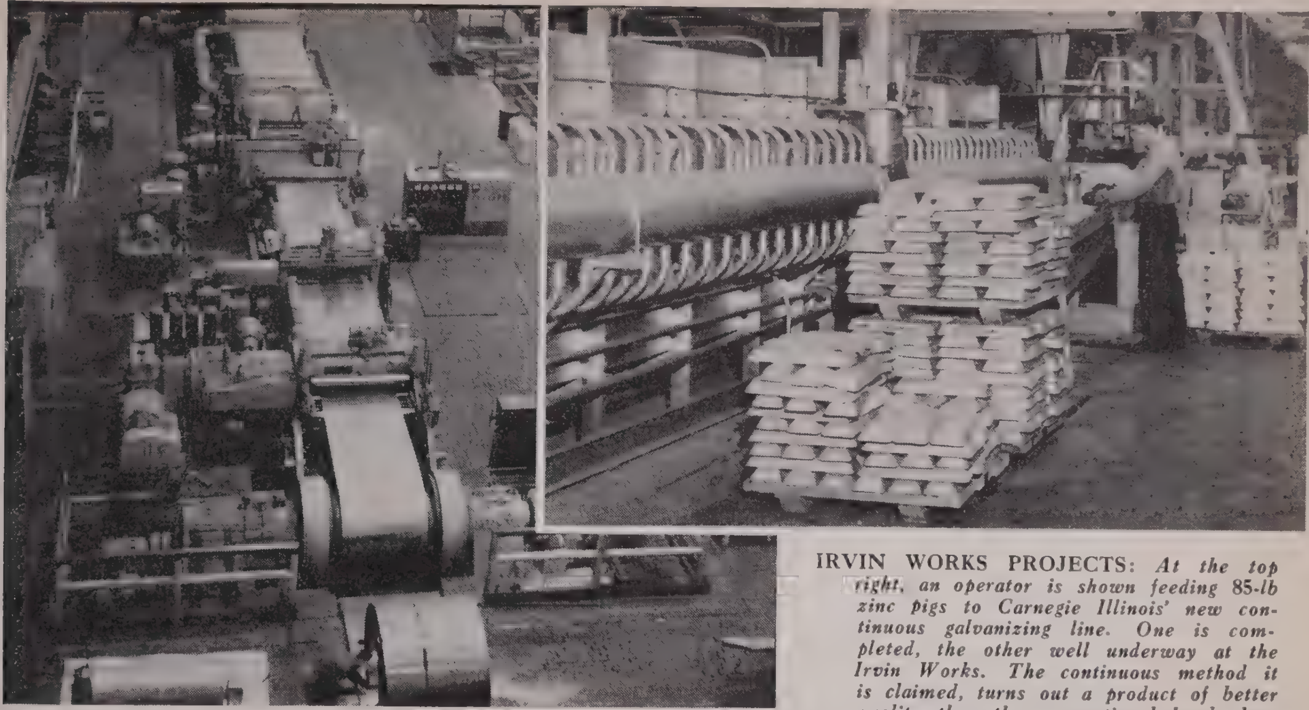
"(Mr.) Clague offered in substantiation of his view these three points: (1) that exports would be maintained by means of the ECA program, (2) that military expenditures would be continued at a high level, and (3) that there is a substantial backlog of buying power and of orders to support a high level of business activity for a relatively long period.

"The thought crosses my mind in connection with the points above that if they are the best that can be offered in support of the thesis of continuing boom it is hanging by a slender thread," Mr. Weisman pointed out.

Other observers, appraising the industry's 1949 potential, take the position that some companies will

(CONTINUED ON PAGE 158)

AVIOMECHANICS: *Aviation mechanics who undergo extensive training are shown working on an engine at the Marine Air Technical Training Center at Quantico, Va.*



IRVIN WORKS PROJECTS: *At the top right, an operator is shown feeding 85-lb zinc pigs to Carnegie Illinois' new continuous galvanizing line. One is completed, the other well underway at the Irvin Works. The continuous method it is claimed, turns out a product of better quality than the conventional hand sheet galvanizing method.*

Carnegie-Illinois Takes Wraps Off Newest Galvanizing Line At Irvin Works

Pittsburgh

• • • **Carnegie-Illinois** Steel Corp. took the wraps off its new continuous galvanizing line at Irvin Works near here Dec. 2. It is believed to be the first continuous strip line to use high frequency induction heating and to process continuously from the unannealed cold-reduced coil to the finished galvanized sheet. It also features a 72-ft deep looping pit which company engineers believe to be the deepest in the country.

Mill officials claimed that use of induction and resistance heating in a controlled atmosphere, coupled with the continuous nature of the operation give an end product superior to any they have been able to obtain with the hand sheet galvanizing method. They say the coating is more adherent, will not break or flake in forming or bending the sheets.

To prove this they conducted a number of "handkerchief" bend tests for the inspecting party with no signs of flaking at the creased edges. This test folds a test specimen on itself in half and then in half again, making it one-fourth the original size. It is then pressed flat in an arbor press to check for flaking at the corners.

Other similar lines may be in use in the industry but details remain secret. Aside from the better quality coating produced on the Irvin Works equipment, the coating is more uniform and reportedly saves some of the zinc formerly deposited. It is much faster, too. The hand process took 10 to 12 days, the new one takes a few minutes—for an obvious labor saving.

Some details on the new line were disclosed by J. E. Lose, operating vice-president. J. H. Elliott, general superintendent, Irvin Works, outlined the main features of the line prior to a press inspection tour of the new setup. It is understood that the equipment has been operating for about 6 months, but this was the first time outsiders were permitted to see it. Data on temperature and control are still secret.

The equipment coats strip from 20 to 54 in. wide and from 11 to 18 gage. Speed is from 8 to 120 fpm, varying inversely with gage. Average production is 300 tons per 24-hr run. A similar type line to coat light gage sheets is being built next to the heavy gage line. It should start operating during the first quarter of next year.

Units of the new line, starting from a cold reduced, but unannealed, coil are: leveler, automatic welder, electrolytic cleaner, looping pit, furnace, galvanizing pot, cooling tower, rinse tanks, bonderizer (which may be rolled in on tracks as needed), looping pit, leveler, and shear.

The furnace, built by General Electric, is over 300 ft long. Its first stage is induction heating, followed by electric resistance heating and then cooling. Heating and cooling to the proper temperature for galvanizing are carried out in a hydrogen-nitrogen atmosphere.

Principal uses for heavy galvanized sheets are railroad car roofing, culverts, storage tanks, drums and refrigerator cars.

Du Pont Buys Plant Site

Wilmington, Del.

• • • **E. I. du Pont de** Nemours & Co. report the purchase of one tract and the exercise of an option on another (1700 acres in all) in the Guadalupe River valley near Victoria, Tex. The site will be used for a projected chemical plant.

Senate Committee Inspects Distribution Data; Requests Capacity Figures

Washington

• • • A **Senate** committee this week looked over steel distribution data supplied by major producers and at the same time asked another group of mills to supply Uncle Sam with data on capacity.

Both the distribution and the capacity questions are being asked by the Senate Small Business Committee.

The new questionnaire—on capacity—is being sent by the committee this week to 185 mills whose facilities are classed as either semi-integrated or nonintegrated.

Information on capacity of integrated mills is already in the hands of the committee and Senator Wherry, R., Neb., the present committee chairman.

Meanwhile, the steel industry's answers to the committee's questions on steel distribution were delivered here this week. But what the committee asked and what the producers answered are two different things.

Last September, the committee decided to ask the nation's 15 largest steel producers how steel output is distributed (THE IRON AGE, Sept. 16, p. 123).

Senator Martin, R., Pa., steel subcommittee chairman, listed a whole hatful of $64 questions in a hefty 3-part questionnaire and said he "saw no reason why we should not get this type of information."

The questionnaire hit the 15 steel presidents' desks simultaneously, together with Senator Martin's request that the answers be back in Washington in 30 days.

Several of the small producers dutifully complied. The larger producers took a grim look at the questions and clammed up. Their self-righteous attitude: "Over our dead bodies."

Finally, the Senate committee and the producers began to bargain. The industry pointed out that the kind of information on steel shipments that the committee was asking would (a) seriously damage their competitive positions, (b) might be misused for political purposes by Administration enemies of the steel industry.

The larger producers told Senator Martin it was nobody's business how much steel they shipped to their affiliated companies, to nonaffiliated companies, to warehouses, and to other customers. Mr. Martin, who hails from Washington, Pa., finally agreed.

The end result was a compromise wherein both the producers and the committee agreed that (a) detailed totals need not be revealed, (b) this was no job for government economists. Price, Waterhouse & Co. was engaged for the fact-gathering job which was to reveal only rounded, total distribution figures.

This week the accounting firm turned over the completed job to Senator Martin. The steel companies' answers will be held in strict confidence, as far as Mr. Martin is concerned. But how long they will remain in confidence after the Democrats take over control of the Senate is anybody's guess.

It has been suggested that if Mr. Murray heads up the Senate Small Business Committee, the egg will hit the fan as far as the steel industry and the 81st Congress are concerned. Possibly. At any rate, get ready to duck if the gentleman from Montana gets his hands on this new capacity and distribution data.

FISH CRATE LINER: *An Aluminum liner for fish crates is being manufactured in England. It is made of a light gage and of the same shape as the wooden crate which it lines. A United Nations committee has accepted this method of handling fish at ports and has recommended that all other countries adopt it.*

New Truck Registrations Decrease from Year Ago

Detroit

• • • **Registration** reports from states which normally account for one-fourth of all registrations indicate that more than 285,000 new cars were registered during the month of October, according to R. L. Polk & Co., Detroit.

Polk statisticians estimate new truck registrations will be approximately 85,000 for October.

New truck registrations from 16 states for October totaled 19,559 compared with a total of 19,875 registered in the same states during October 1947.

Stainless Producers Concentrate on Gutter, Downspout Business

Market Offers Fair Tonnage Possibilities Because of High Copper Prices

○ ○ ○

By JOHN ANTHONY
Eastern Regional Editor

○ ○ ○

Philadelphia

• • • **Stainless steel** strip producers are making a concentrated effort to capture the gutter and downspout market, a field that has in the past been controlled solely by producers of rolled copper and galvanized steel strip. Although there had been some use of stainless steel for this purpose before the war, conditions in the metal market were not as promising for this promotion as at present with the high price of copper and shortages of both copper and galvanized steel.

Some fabricators of gutters and downspouts are now selling 28 gage stainless products to jobbers at prices averaging 10 to 14 pct lower than for the same items fabricated from 16 oz copper. Fabricators are rapidly expanding their stainless line and are ready to offer conductor pipe, eaves troughs, mitres, elbows, shanks and circles and fittings and connections in a wide variety of types and sizes.

Benjamin P. Obdyke, Inc., Philadelphia 23, one of the earliest to enter the field, offers stainless conductor pipe for immediate delivery in diameters from 2 to 6 in. in plain and corrugated rounds. Corrugated squares are offered in diameters from 2 to 5 in. The larger sizes are used for industrial buildings, for the flash floods of the South and often for the flue linings for gas heaters.

Gutters and downspouts made of stainless steel offer certain advantages to the homeowner. It is a metal that is inherently resistant to corrosion and there is no possibility of streaking white walls with the products of oxidation. The strength of the metal is high and, when properly installed, gutters and downspouts may be expected to give no trouble throughout the life of the building. The gutters will not sag, if properly designed, despite the light gage in general use for this purpose.

All producers of stainless strip are actively promoting the market at this time, but only one, Berger Mfg. Div. of Republic Steel Corp., Canton, Ohio, has entered the fabricating field so far. Producers are confident that the market offers fair tonnage prospects, particularly while the price of copper remains as high as it is. Having once introduced the metal in this field on a large scale they feel sure that it can hold at least a portion of the market on its merits even when competitive metals are more readily available and sell at lower prices.

The fabricators of stainless roof drainage products are very enthusiastic about their advantages but are encountering the resistance to be expected when a new development is promoted. Those who sell only through jobbers find that they are reluctant to build up their inventories by adding another complete line of products. And the enthusiasm of the fabricators as to the advantages of stainless is not generally passed along by the jobber to the roofing contractor. The roofer who has not already handled the stainless products is usually fearful of difficulties in new installation techniques.

There is actually no important change in practice required for stainless gutters and downspouts. The 28 gage stainless works about like the standard 26 gage galvanized steel and can be handled

FABRICATED STAINLESS STEEL ROOF DRAINAGE SECTIONS

MANUFACTURERS

Barnes Metal Products Co., Chicago
Berger Bros. Co., Philadelphia
Berger Mfg. Div., Republic Steel Corp., Canton, Ohio
Boyd & Sons Mfg. Co., Philadelphia
Campbell Stainless Products Co., Washington, Pa.
Cincinnati Elbow Co., Cincinnati
Clingan & Fortier, Inc., San Francisco
Ferdinand Dieckmann Co., Cincinnati
Klauer Mfg. Co., Dubuque, Iowa
Lamb & Ritchie Co., Cambridge, Mass.
Moncrief-Lenoir Mfg. Co., Houston
Benjamin P. Obdyke, Inc., Philadelphia
Orleans Steel Products Co., New Orleans
Royal Apex, Brooklyn
Tiffin Art Metal Co., Tiffin, Ohio

DISTRIBUTORS

Anti Corrosive Metal Products Co., Castleton-on-Hudson, N. Y.
Austin-Hastings Co., Cambridge, Mass.
Berger Mfg. Div., Republic Steel Corp., Philadelphia, St. Louis
Berger Mfg. Co. of Mass., Boston
Carter-Donlevy Co., Philadelphia
Chicago Steel Service, Chicago
Congdon & Carpenter Co., Providence
Demmler Bros. Co., Pittsburgh
Fable & Co., Philadelphia
Follansbee Metal Warehouses, Pittsburgh
Arthur C. Harvey, Allston, Mass.
Herrick Co., Boston
Industrial Steels, Inc., Cambridge, Mass., New York
K & S Metal Supply, Inc., Brooklyn
McClure-Johnston Co., Pittsburgh
Potts-Farrington Co., Philadelphia
Todd Steel Co., Detroit
J. M. Tull Metal & Supply Co., Atlanta, Ga.
Vorys Bros., Inc., Columbus, Ohio
York Corrugating Co., Jersey City

on conventional equipment. The ordinary good soldering practice is recommended for joining, using 50-50 solder or commercial stainless steel solders. Stainless steel accessories such as hangers, hooks, circles, straps and shanks are preferred, but lead-coated bronze or lead-coated copper accessories may be used satisfactorily. Nails, rivets, cleats, screws and bolts must be stainless steel.

A most important precaution, however, is that immediately after soldering all joints must be washed off with a 5 to 10 pct solution of washing soda in water, followed by a rinse in clear water. All acid flux must be removed.

Most fabricators employ No. 1 finish strip, pickled and annealed. This dull finish provides a good tooth for the solder and is subdued in appearance for the best architectural treatment. This finish makes a good base for painting if desired.

Fabricators buy strip in quantities of 10,000 lb per width, the base quantity, in order to be able to offer stainless at prices below or comparable to copper. Even the most enthusiastic fabricators continue to produce copper and galvanized products and so far these metals constitute the bulk of their production. One fabricator estimates that copper is roughly 4½ times the cost of galvanized to the jobber at present prices. Stainless is 4 times the cost of galvanized. Stainless steel products weigh a little more than half as much as copper.

Fabricators and jobbers of stainless roofing drainage products so far as they are known at present are listed in the table.

Austrian Engineers Insist on American Made Blooming Mill

Washington

• • • **A modern** blooming mill with a rated capacity of 40,000 metric tons of blooms and slabs a month will be constructed at Donawitz, Austria, with the help of ECA funds. Use of $4.3 million for this purpose has been approved by the Economic Cooperation Administration.

It will replace the existing steam-driven mill owned by the Alpine-Montan Gesellschaft, Austria's largest steel company, which the ECA says is virtually worn out and at which breakdowns are the rule rather than the exception.

Present requirements for the processing mills at Donawitz call for 4-ton ingots, but the present blooming mill, now more than 50 years old, was built to handle 1½-ton ingots. Aside from long delays caused by breakdowns, the ECA says the old mill has to be run continuously to supply the processing mills and that 30,000 tons is the maximum obtainable.

The new mill will be electrically driven and will produce 40,000 tons on a 2-shift basis, allowing sufficient leeway for additional production when demand requires and time for overhauling or repairs.

Originally it had been planned to order the mill installation from German interests. However, these plans were changed when Austrian engineers held out for American-made equipment. This, they said, was not only superior to present European materials but could also be delivered and set up in half the time.

Estimates of delivery for German equipment were set at 2 years while the electric motors, obtainable only in Switzerland, would require a 3-year interim.

Sixteen months was estimated as the maximum time necessary for delivery of American-made motors and 12 months for the remainder of the equipment.

Because of the need for steel in Europe, the ECA says, construction of the mill has been given top priority in the Austrian industrial recovery projects.

Coming Events

1949
Jan. 10-14 **Society of Automotive Engineers**, annual meeting, Detroit.
Jan. 10-14 **Material Handling Institute and American Society of Mechanical Engineers**, Materials Handling Show, Philadelphia.
Jan. 14 **Malleable Founders' Society**, semiannual meeting, Cleveland.
Jan. 24-28 **American Society of Heating & Ventilating Engineers**, annual meeting, Chicago.
Feb. 14-17 **American Institute of Mining & Metallurgical Engineers**, annual meeting, San Francisco.
Feb. 28-Mar. 4 **American Society for Testing Materials**, spring meeting, Chicago.
Mar. 8-10 **Society of Automotive Engineers**, passenger car, body and production meeting, Detroit.

Study Ways and Means Of Getting Industrial Scrap

Washington

• • • **New ways** and means of prying loose industrial scrap during the coming months were scheduled for discussion this week at a meeting of Commerce Secretary Sawyer's Scrap Drive Committee.

Alex Miller, chief scrap consultant of the Office of Industry Cooperation and chairman of the government's Interdepartmental Ferrous Scrap Committee, said the winter scrap drive is aimed primarily at industry, auto wrecking yards, and farms. Collection of home scrap is not contemplated at this time, he stated.

Such high grade heavy scrap as obsolete jigs, dies, tools, fixtures, tractors, plows and junked cars is sought in the present phase of the drive.

More than 70 trade association executives are serving on the committee at the present time, Mr. Miller stated.

Scrap Men Choose Officers

Jacksonville, Fla.

• • • **Irving Levin** of the Superior Iron & Metal Co., Jacksonville, was reelected president of the Southeastern Chapter, Institute of Scrap Iron & Steel, at a quarterly meeting of the chapter held here Nov. 19, 20 and 21.

Louis B. Cline, Nashville, Cline & Bernheim, was reelected first vice president, Max Kimerling, Birmingham, M. Kimerling & Sons, was reelected second vice president, and H. T. Herndon, Atlanta, J. T. Knight & Sons, was reelected third vice president.

H. B. Luria, Birmingham, Luria Bros. & Co., was elected fourth vice president, and Ben Schottenfels, Jr., Birmingham, David J. Joseph Co., was elected secretary and treasurer.

Justice Dept. Names Republic Steel Corp. Defendant In Antitrust Complaint

Washington

• • • **The Justice Dept.** last week filed a civil antitrust complaint charging Republic Steel Corp., 19 other fabricators of culvert pipe, and Toncan Culvert Manufacturers' Assn. with restraining competition in the manufacture and sale of corrugated sheet metal and culvert pipe.

The complaint, filed in the Federal Court of Cleveland, charges that Republic and 19 other fabricators of metal culvert pipe have allocated territories for making and selling this pipe. Republic reserved the exclusive right to make and sell this pipe in Ohio, West Virginia, Pennsylvania, New Jersey, Delaware, Maryland, the District of Columbia, and in all foreign countries.

Each of the 19 other fabricators has been allotted the exclusive right to make and sell the pipe in carefully-defined geographical areas throughout the United States.

The complaint also charges that each of the 19 fabricators agree to buy all its requirements of sheet metal used in fabricating metal culvert pipe from Republic.

The complaint alleges that the Toncan Culvert Manufacturers' Assn. aided in the enforcement of the restrictions on the manufacture and sale of metal culvert pipe and participated in establishing quotas of sheet metal used by Republic in allocating this product.

The Attorney General said: "Governmental agencies are the principal purchasers of metal culvert pipe which is used primarily for drainage purposes in the construction of highways and airports.

"This complaint is filed pursuant to the Department's announced program of aiding Federal, state and local governments by eliminating restraints of trade and monopolies in the sale of those items which they purchase in large quantities."

Herbert A. Bergson, Assistant Attorney General in charge of the Antitrust Div., said: "Republic is one of the two largest producers in the United States of corrugated sheet metal used for fabricating metal culvert pipe and is also an important fabricator of the pipe itself.

"The complaint alleged that for a number of years it has been engaging in activities having the effect of eliminating competition between the defendants in fabricating and selling this pipe. Our municipalities and other purchasers have a right to the advantages of a free competitive market.

"To help attain this goal, we seek cancellation of the allocation agreements and dissolution of the Association. We also seek to enjoin Republic from buying out fabricators of culvert pipe or from requiring any of these fabricators to deal exclusively with Republic or to refrain from selling pipe except in a prescribed territory."

The complaint names as defendants: Republic Steel Corp., Cleveland; Toncan Manufacturers' Assn., Cleveland; Beall Pipe & Tank Corp., Portland, Oregon; Berger Metal Culvert Co., Inc., Westminster, Vt.; Boardman Co., Oklahoma City, Okla.; Central Culvert Corp., Alexandria, La.; Conner Manufacturing Co., Louisville, Ky.; Choctaw, Inc., Memphis, Tenn.; Dominion Metal & Culvert Corp., Roanoke, Va.; Eaton Metal Products Corp., Omaha, Nebr.; Eaton Metal Products Co. of Montana, Billings, Mont.; Empire State Culvert Corp., Groton, N. Y.; Illinois Culvert & Tank Co., Peoria, Ill.; Jensen Bridge & Supply Co., Sandusky, Mich.; H. V. Johnston Culvert Co., Minneapolis, H. V. Johnston Culvert Co., Aberdeen, South Dakota; M & M Hiway Materials Co., Columbia, Miss.; Thompson Pipe & Steel Co., Denver; Tri-State Culvert & Manufacturing Co., Tampa, Fla.; Wisconsin Culvert Co., Madison, Wisc.; Wyatt Metal & Boiler Works, Dallas.

Strikes Continue Decline

Washington

• • • **Despite the** West Coast shipping and refinery strikes, plus the New York bus drivers' strike, idleness from labor disputes continued its decline in October.

According to the Bureau of Labor Statistics, the total new strikes during the month amounted to only 240. Including holdovers from September, the total work stoppages was 425 disputes which involved 200,000 workers and lost 2 million man-days to production.

For the first 10 months of 1948, BLS says, work stoppages totalled 2950 as compared with 3396 last year and 4473 for the same months in 1946.

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TINY: *The sparkplug, shown left, belongs to the first ram-jet helicopter ever built. Pretty small compared to those used in automobiles. In the foreground is one of the two ram-jet units which weigh only 10 lb each.*

○ ○ ○

H. Edgar Lewis Dies; Former Head of Jones Laughlin Steel Corp.

Pittsburgh

• • • **H. Edgar Lewis,** 66, former president of Jones & Laughlin Steel Corp., died Sunday of pneumonia. He had resigned as president and chairman of the board in 1947 because of ill health.

H. Edgar Lewis

Mr. Lewis was born in Pontardulais, Wales, the son of a tinmill roller. He came to this country with his family at the age of 14. Three years later he began as a steelworker at the Duquesne works of Carnegie Steel Co.

In 1906 he left Carnegie Steel to work for Bethlehem Steel Co. under the late Charles M. Schwab. He left Bethlehem in 1930 to become chairman of the executive committee of the Jeffrey Manufacturing Co. of Columbus, Ohio.

In 1936 he was elected chairman of the board, a director and member of the executive committee of Jones & Laughlin Steel Corp. In 1938 he was named president of the corporation.

Mr. Lewis was a director of the Jeffrey Manufacturing Co., British Jeffrey Diamond, Ltd., a former director of Kelsey-Hayes Wheel Co. and the Ohio Malleable Iron Co. and an honorary vice-president of the American Iron and Steel Institute.

He was mentioned in 1942 as a candidate for the Republican nomination for Governor of Pennsylvania, but rejected the suggestion, declaring he could do more for the war effort as head of Jones and Laughlin.

Machine Tool Business

(CONTINUED FROM 152)

do very well, but the industry as a whole may not be able to top shipments of some $250 million in 1949. This prognostication assumes that the scheduled $56 million from ECA is a certainty, leaving a theoretical $194 million to be built up in a thin and spotty domestic market. Although conditions today are not identical, the pattern of the '20's might repeat itself, according to some observers. It will be recalled that the industry hit a high in 1917, World War I ended in 1918, and 1919 was a year of large exports. Inflation and slump arrived in 1920 and in 1921 the machine tool business was off 76 pct of 1920.

But regardless of the variables, a machine tool industry of $600 million capacity and currently producing less than half that amount, faces in 1949 some of the most challenging sales problems.

Construction Steel . . .

• • • **Fabricated steel awards** this week included the following:

1530 **Tons,** Burnside, Ky., state highway bridge to Midland Structural Steel Co., Cicero, Ill.

175 **Tons,** Yuma Co., Ariz., Lugurta underpass and approaches, Yuma-Gila Bend Highway, through Western Constructors, El Paso, to Bethlehem Pacific Coast Steel Corp.

110 **Tons,** Boston, new building and escalator, Boston Transit Co., Atlantic Ave., through Gahagan Construction Co., to Grosser & Shlager Iron Works, Somerville, Mass.

110 **Tons,** Bronx, N. Y. Shield of David Home, Andrews & Tremont Ave. to Grand Iron Works, New York.

• • • **Fabricated steel inquiries** this week included the following:

1100 **Tons,** Wildwood, N. J., Grassy Sound bridge on Route S-47, Cape May Co., Kolyn Construction Co., Trenton, low bidder.

480 **Tons,** Somerville, Somerset Co., N. J., bridge, N. J. Dept. of Highways, Dec. 16.

300 **Tons,** Lewistown, Pa., state hospital, due Jan. 4.

200 **Tons,** Stroudsburg, Pa., extension to general hospital, due Dec. 15.

200 **Tons,** Vienna, Md., addition to utility station, due Dec. 15.

190 **Tons,** Thornton, Calif., bridge across Mokelumne River, Calif. Div. of Highways, Sacramento, bids to Dec. 22.

125 **Tons,** Portland, Ore., ramp approaches, etc., steel bridge, Ore. State Highway Commission, bids to Dec. 21.

105 **Tons,** Hamden, Conn., 2-span steel girder bridge and approaches, Wilbur Cross Parkway project, Mariani Construction Co., New Haven, Conn., low bidder.

• • • **Reinforcing bar awards** this week included the following:

200 **Tons,** Lebanon, Pa., Pennsylvania Turnpike Section 23C, to Patterson Construction Co., Monongahela, Pa.

400 **Tons,** Boston, substructure for Boston approach to Mystic River Bridge, through Gahagan Construction Co., Boston, to Concrete Steel Co., Boston.

400 **Tons,** Chelsea, Mass., John Adams Veterans Hospital through M. S. Kelliher Co., Boston, to Bethlehem Steel Co., Bethlehem, and Northern Steel Co., Boston.

300 **Tons,** Cook Co., Ill., Caldwell Ave. bridge to Thomas McLean Construction Co.

• • • **Reinforcing bar inquiries** this week included the following:

21,000 **Tons,** Ft. Randall, S. D., U. S. Engineers, Omaha office, taking bids on outlet pipe for Ft. Randall dam. Bids close Dec. 17.

2500 **Tons,** South Boston, Mass., housing project through John Bowen, Inc.

645 **Tons,** Portland, Ore., ramp approaches, etc., steel bridge, Ore. State Highway Commission, bids to Dec. 21.

475 **Tons,** Chicago, Beverly Calumet sewer project, bids close Dec. 17.

195 **Tons,** Redding, Calif., structures and railroad relocation, Keswick Reservoir, Bureau of Reclamation, Redding, Spec. 2477, bids to Dec. 29.

150 **Tons,** Beloit, Wis., high school building, bids close Dec. 12; awarding of this job will be postponed until Jan. 4.

• • • **Cast iron pipe awards** this week included the following:

4500 **Tons,** Chicopee, Mass., aqueduct, through Ralph Civitarese Co., Dedham, Mass. to Warren Pipe & Foundry Co., Phillipsburg, N. J., (also 120 tons iron fittings, same job).

• • • **Piling awards** this week included the following:

440 **Tons,** Boston, substructure for Boston approach to Mystic River Bridge, through Gahagan Construction Co., Boston, to Bethlehem Steel Co., Bethlehem.

250 **Tons,** Cincinnati, Crisco plant for Procter & Gamble Co., through Day & Zimmerman, to Bethlehem Steel Co. Inc., Bethlehem.

155 **Tons,** Devon, Conn., Connecticut Light & Power Co., through United Engineers & Constructors, Inc., to Bethlehem Steel Co. Inc., Bethlehem.

• • • **Piling inquiries** this week included the following:

360 **Tons,** Philadelphia, Port Richmond generating station, Philadelphia Electric Co.

220 **Tons,** Binghamton, N. Y., N. Y. State Power Co., through Gilbert Associates, Reading, Pa.

• • • **Railroad car awards and inquiries** this week included the following:

The Northern Pacific R.R. plans to build the following cars in their own shops: 250 50-ton drop-bottom gondolas; 250 50-ton hoppers 200 70-ton ore cars. This Railroad will also place an order for 250 refrigerator cars with an independent builder. Great Lakes Northern R.R. will build 1000 box cars in their own shops. The Western Pacific R.R. has ordered 250 70-ton drop-end gondola cars from the Greenville Steel Car Co. The Rock Island R.R. will build 1000 gondolas in their own shops. Pullman Standard Car Mfg. Co. has a contract from Southern Rwy. for 50 all steel box cars. The Penn R.R. is completing their run of 2000 gondolas built at their Altoona shops and are planning to build 2000 more.

American Car & Foundry has received an order for 100 70-ton hopper cars from the Detroit, Toledo & Ironton R.R. Illinois Central will build 100 70-ton hoppers in their own shops. Milwaukee R.R. will build 3880 cars in their shops as follows: 2330 gondolas; 1000 box; 50 caboose; 500 flat. Merchants Dispatch Transportation Corp. has ordered 60 50-ton refrigerator cars from Dispatch shops. The Santa Fe R.R. had ordered 500 70-ton hopper cars from the Pullman Standard Car Mfg. Co.'s plant at Michigan City. The Union Pacific, it is reported, is planning to use Corten in repair of 1000 gondolas and 1000 50-ton hopper cars in their MRO program of 1950. Rock Island in their program of building 1000 new gondolas is planning to use 50 pct high strength low alloy steel, by weight, in building these gondolas.

Purchase of Company Rests on Ability of Lawyers to Get Stock

Philadelphia

• • • **An offer to** purchase the majority stock of the Taylor-Wharton Iron & Steel Co. of High Bridge, N. J., at a price of $34.75 a share has been made by two Cincinnati attorneys, Fred Weiland and Joseph H. Hoodin, who have been unwilling to disclose the names of principals. The offer is contingent on the offer of a minimum of 56,668 shares out of the 83,832 shares outstanding.

The offer was made in a letter to stockholders which included the information that the holders of some 20,000 shares had already signified intention to accept the offer and make the stock deposit. Letters of credit for $2,030,000 issued by the First National Bank of Cincinnati have been deposited with the Chase National Bank of New York to guarantee purchase when the full number of shares are on deposit.

An investigation by executives of the company leads them to the belief that the principals are Philip Moskowitz, Cincinnati scrap dealer, and J. Sidney Rose, head of the Cleveland Wrecking Co., Cincinnati. George R. Hanks, Taylor-Wharton Co. president, said that the net assets of the company have a share value equal to the price offered and that the value of the company as a going business receives no consideration. According to Mr. Hanks, there has been no study of the company's books or records so as to determine its financial position and business prospects.

The company operates three plants at High Bridge, N. J.; Easton, Pa., and at Hamilton, Ohio, under the name of its subsidiary, the Hamilton Frog & Switch Co. At High Bridge, the company produces manganese steel castings, principally used by the railroad industry. It also produces Alnico magents, an alloy of aluminum, nickel and cobalt used for electronic applications.

At Easton, the company produces special track work, crossings, switches, etc., and seamless high pressure gas containers for oxygen, hydrogen, nitrogen and carbon dioxide. The Hamilton plant produces railroad track specialties. Electric furnace capacity at High Bridge is relatively small with furnaces of 6 ton, 3½ ton and 1000 lb capacity. There are also several smaller induction furnaces.

Mr. Hanks released the following statement: "It is my opinion and that of my associates on the board of directors that the offer for control is inadequate. For this reason and because the offer is subject to so many conditions, it might more properly be called a mere request for an irrevocable option. We and our close associates who own approximately 20 pct of the stock, therefore, do not propose to accept the offer.

"If you deposit your shares you are not actually accepting an offer but are in effect giving unknown individuals an option on your stock without any consideration. They have the right to extend this option to Jan. 17, 1949."

Mr. Hanks states that all debt has been retired and the company's current asset position is strong. Earnings for the third quarter of 1948 were larger than for the first 6 months and business continues to be good. He calls attention to improvements under way or completed at both the Easton, Pa., and High Bridge plants of the company and says stockholders may look forward to a time when the company can pay out a larger share of its earnings than it has in the past.

50 YEARS AGO

THE IRON AGE, *December 8, 1898*

• "Wearied by years of reckless competition with its frightful effect on annual balance sheets, manufacturers are listening approvingly to the wiles of the promoters of consolidations. American producers have pretty well exhausted every combination, pooling and sales handling scheme imaginable, and have found all wanting. The conviction has grown that nothing short of a consolidation of interests as comprehensive as possible will bring relief."

• **"Rumors of an 'oyster trust' come from Connecticut where a syndicate of capitalists are preparing to buy up 3000 acres of oyster beds along the coast."**

• "The governor of the state of Illinois has been indicted for 'wilful, unlawful, palpable omission of his duty' in refusing to suppress the riotous demonstrations of striking coal miners, which caused bloodshed and a number of deaths. The governor had supported the miners; a new position for a governor in an American commonwealth to take. He permitted his sympathy to go too far."

• **"The towboat 'Iron Age' lost her entire tow of boats laden with steel rails on the Mississippi river during a severe storm. Six thousand tons of rails were under tow to New Orleans."**

• "Kansas is experiencing a coal famine which is the worst ever known in the state. The railroads are charged with being responsible for this condition. Managers admit they confiscate coal for engine use, later paying the mine owner. The railroads claim they are justified in seizing the coal and submit the fact that unless their trains run, dealers cannot secure coal."

• **"The recent assertion by Kaiser Wilhelm at Stettin, that Germany's future lies on the water, serves as another illustration of the growing acceptance of the importance of sea power. Today, all countries not committed to the policy of political and commercial isolation, which so long distinguished China, have been awakened to the importance of increasing trade through sea power."**

Where chrome contamination is a problem

USE
WYANDOTTE
NO. 90

Wyandotte No. 90 is a heavy-duty reverse current electrocleaner designed to remove fabricating compounds and smut from ferrous parts before plating.

Because of its extremely high chrome tolerance, it is especially valuable when used in automatic equipment where the work is not re-racked prior to chrome plating. With No. 90 in the cleaner tank, there's little danger of the chrome trapped in plating racks contaminating the solution.

No. 90 contains special ingredients which condition the solution water and improve rinsing. It does not foam excessively and has long life in solution. It is highly recommended for cleaning magnesium castings, copper, bronze, iron, beryllium copper and many alloys.

Why not get all the facts on this specialized Wyandotte Product? Remember, too, that Wyandotte makes the *complete* line of metal cleaners. For information, just call your nearest Wyandotte Representative.

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New Type of Engine And Better Boiler Is Under Development

Pittsburgh

• • • **Construction of** an entirely new type of gas turbine electric locomotive and design of a better boiler for reciprocating steam engines are current projects designed to improve steam locomotive efficiency. H. E. Dralle, manager of the transportation section of the Westinghouse industry engineering department, sees the steam locomotive facing tough competition but "far from dead." These projects, and others, he hopes, will breathe new life into the old kettle.

A geared turbine locomotive has been in service on the Pennsylvania R.R. since 1944. This unit, which Mr. Dralle said had proven exceptionally good for passenger runs, transmits power from the steam turbine through gears directly to the wheels.

The engine now being built will transmit power from the turbine through a generator to traction motors on the axles. The result will be greater flexibility.

Mr. Dralle said that development of a better boiler is now being intensively pushed. Results of this work may mean a cut of at least 30 pct in steam consumption per hp-hr and a reduction of about 50 pct in fuel consumption.

He also predicted that the electric locomotive of the future will be able to haul trains of 15 to 20 passenger cars at speeds of 100 to 125 mph and will be able to pull 100 to 125-car freight trains at 60 to 70 mph.

Gray Iron Founders Meet

Cleveland

• • • **The Virginia** Management Executives group, Gray Iron Founders' Society, was formed at a meeting in Richmond, Va., attended by leading gray iron foundrymen of the state.

J. Scott Parrish, Jr., president, Richmond Foundry & Mfg. Co., was elected chairman; R. G. Harris, secretary-treasurer, Strickland Machine Co., Richmond, was named vice-chairman. The group proposes to stage a drive to enlist all progressive gray iron foundries in group membership.

Japan's Steel Industry Makes Strong Effort To Restore Prewar Output

Philadelphia

• • • **The Japanese steel** industry is making a strong effort, with the help and cooperation of the Supreme Commander for the Allied Power in Occupied Japan, to restore production to its prewar status but is considerably handicapped by lack of iron ore, pig iron, coal and coke, according to Richard W. Emmerling, vice-president of Charles Dreifus Co. here. Mr. Emmerling has just returned from an airplane trip around the world in which he visited Japan, the Philippines, China, India, France and England.

Japanese authorities and SCAP do not approve of exporting much steel, but the exportation of 20,000 tons of sheets to the South American market on a barter basis was permitted this year. Also about 10,000 tons of seamless tubing has been exported to Arabia and the United States at prices above $200 a ton.

In Europe, Emmerling found that many of the mills are anxious to sell steel for export to countries that can pay in dollars or other hard currency such as Swiss francs. However, prices quoted by European mills c.i.f. Atlantic ports are frequently more than double current mill quotations in the United States.

Japanese steel production for export is only a small percentage of the total production and is subject to advance allocation by the Economic Stabilization Board, the Iron and Steel Bureau of the Ministry of Commerce with the approval of SCAP.

September production of steel in Japan totaled 114,206 metric tons of rolled steel compared with 98,718 tons in August which brought the total for six months to 553,190 metric tons. Production of 412,428 metric tons of pig iron and 832,829 metric tons of steel ingots in the first six months of the current fiscal year are approximately 70 pct to 75 pct and 60 pct to 65 pct, respectively, of the 1930-1934 base period. September production of pig iron amounted to

(CONTINUED ON PAGE 164)

"Miss Great Lakes" Gold Cup winner for '48
Depended on Wheelock, Lovejoy Alloy Steel

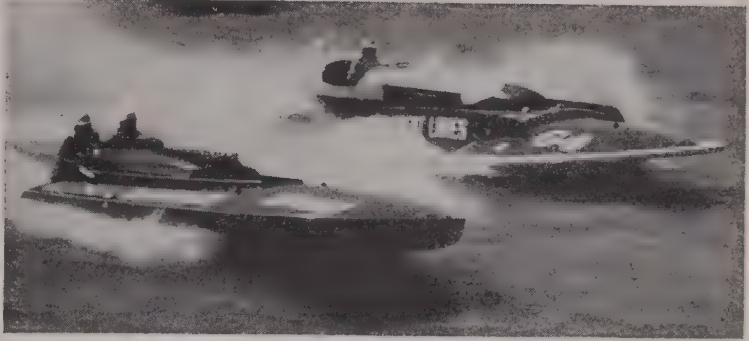


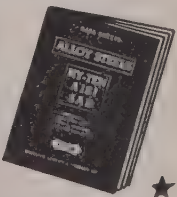
Photo Courtesy The Detroit News

UNUSUALLY ROUGH RACING CONDITIONS DISABLED 12 OUT OF 14 BOATS

Properly selected alloy steel, from which vital equipment was fabricated, played a leading role in winning the grueling 1948 Gold Cup race that saw only 2 of 14 starters cross the finish line. The winner, "MISS GREAT LAKES", driven by Danny Foster and owned by Al Fallon, had underwater struts, rudder, jack shaft and steering pitman arm made from Wheelock, Lovejoy HY-TEN B #3X steel. This particular alloy was selected and properly heat treated to meet the most rugged conditions possible. The fact that not one of these parts failed or even bent, in spite of the terrific beating they took, is ample proof of HY-TEN's superior physicals. And it's proof too that Wheelock, Lovejoy knows steel. Perhaps you have a tough job that demands just the right steel—write Wheelock, Lovejoy today.

WL *steels are metallurgically constant. This guarantees uniformity of chemistry, grain size, hardenability—thus eliminating costly changes in heat treating specifications.*

Write today for your FREE COPY of the Wheelock, Lovejoy Data Book. It contains complete technical information on grades, applications, physical properties, tests, heat treating, etc.



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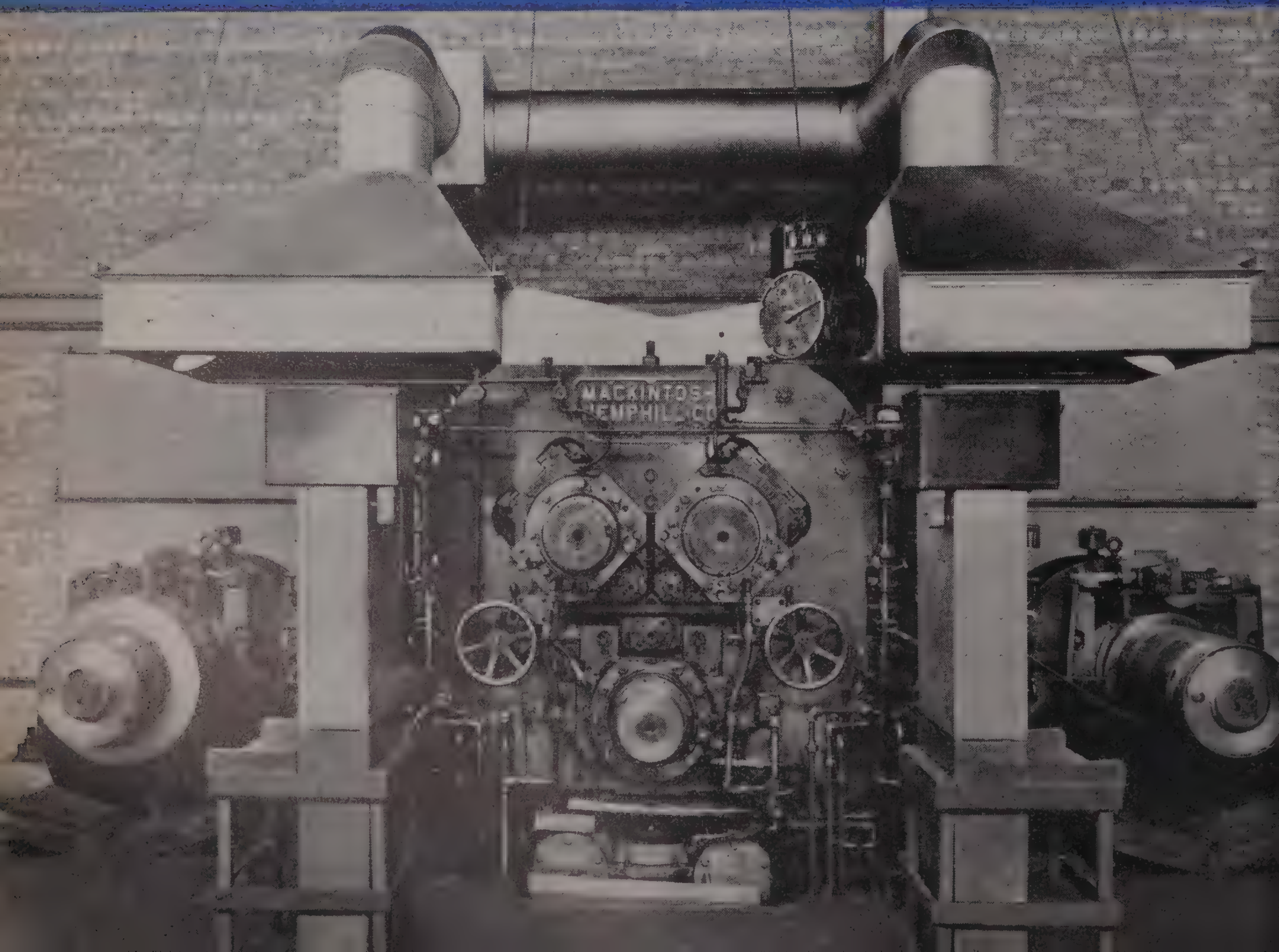
BILLETS AND FORGINGS FOR PRODUCTION, TOOL ROOM AND MAINTENANCE REQUIREMENTS.

Versatility and productive capacity key features of Y-type reversing cold strip mill

Mackintosh-Hemphill Y-Mill, a 7-Roll reversing cold strip mill utilizing small-diameter work rolls.


MACKINTOS
HEMPHILL CO

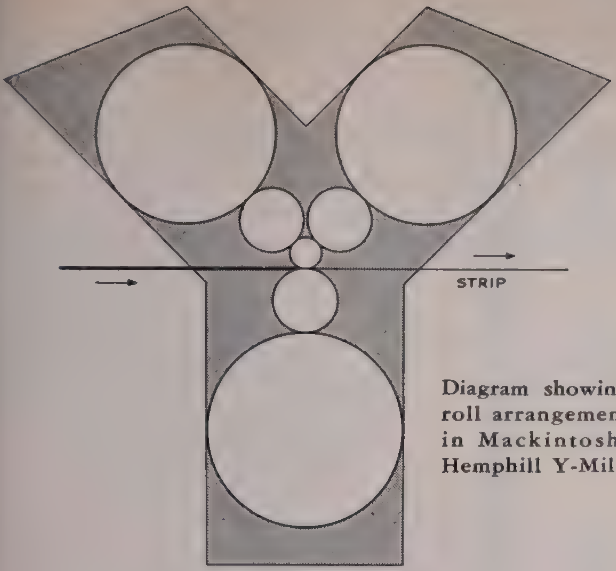
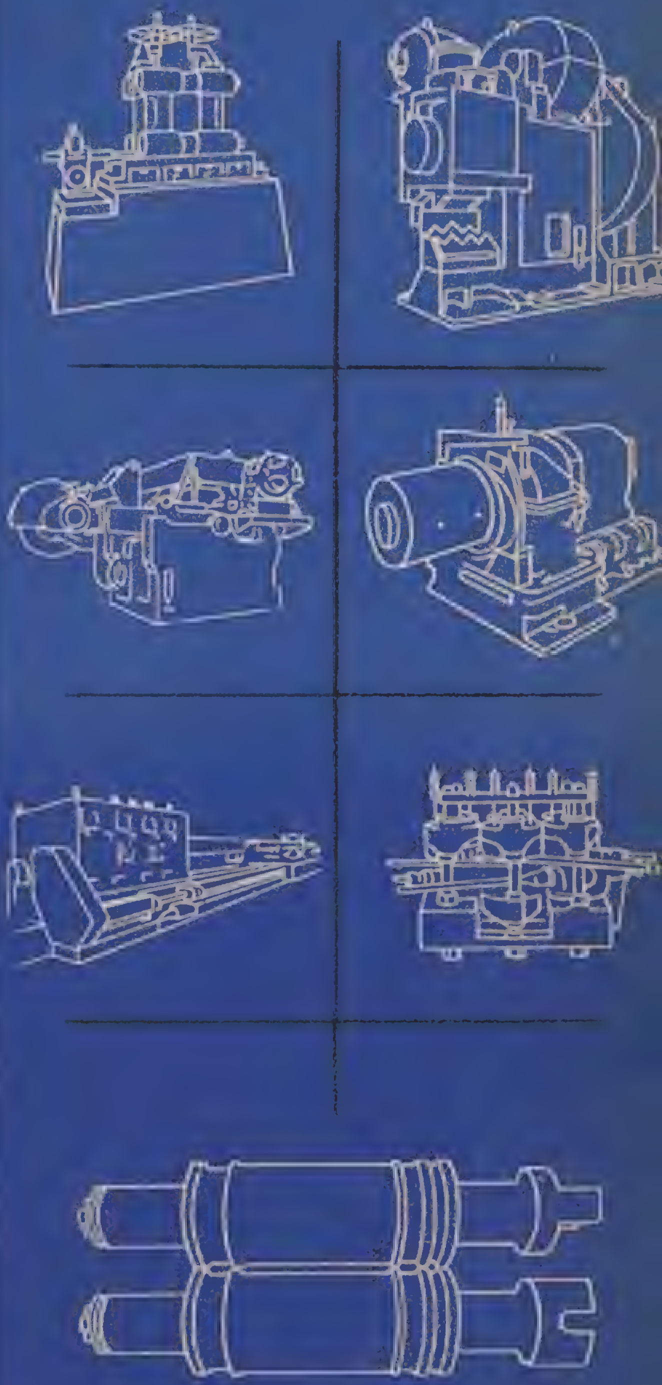


Diagram showing roll arrangement in Mackintosh-Hemphill Y-Mill.

Some of the widely diversified types of production machinery manufactured by Mackintosh-Hemphill for the metals industry.



Designed for high-speed rolling of all grades of steel, the Mackintosh-Hemphill 7-Roll reversing cold strip mill employs small-diameter work rolls for reducing hot-rolled strip to commercial cold-rolled gauges.

The Y-type arrangement of the rolls in a compact, rigid housing results in increased penetration ability over a 4-high mill, with equivalent surface finish and greater accuracy of gauge.

Characteristics of the Mackintosh-Hemphill Y-Mill include—

- Low Separating Force Between Work Rolls
- Long Roll Life
- Operates at 1200 Feet Per Minute On Finish Passes

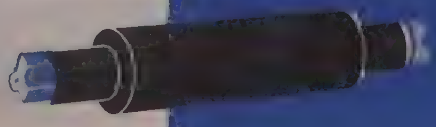
This modern mill for modern metals can be used in rolling all grades of steel and non-ferrous strip, and is particularly effective in reducing the higher-carbon steels. In actual operation the Mackintosh-Hemphill Y-Mill has demonstrated these advantages—

- High Productive Capacity on Hard Metals
- Elimination of Intermediate Anneals
- Uniformity of Product Rolled
- Simplicity of Adjustment and Operation

If you process commercial tonnages of strip, or plan to increase your rolling capacity, there's a place in your productioneering program for a Mack-Hemp Reversing Cold Strip Mill; Mackintosh-Hemphill engineers will show you how well the Y-Mill fits your requirements.

And when you buy Mack-Hemp Rolling-Mill Machinery you can expect superior performance. For more than a century Mack-Hemp equipment has been tested and accepted wherever operators demanded exceptional metal-rolling results. In your planning for expansion or modernization it will pay you to keep your eye on what's new at Mack-Hemp.

MACKINTOSH-HEMPHILL CO.



Makers of the Rolls with the Red Wabblers

PITTSBURGH AND MIDLAND, PA.

Other Mackintosh-Hemphill [illegible]
[illegible]

ROLLS . . . STEEL AND SPECIAL ALLOY CAST.
[illegible]
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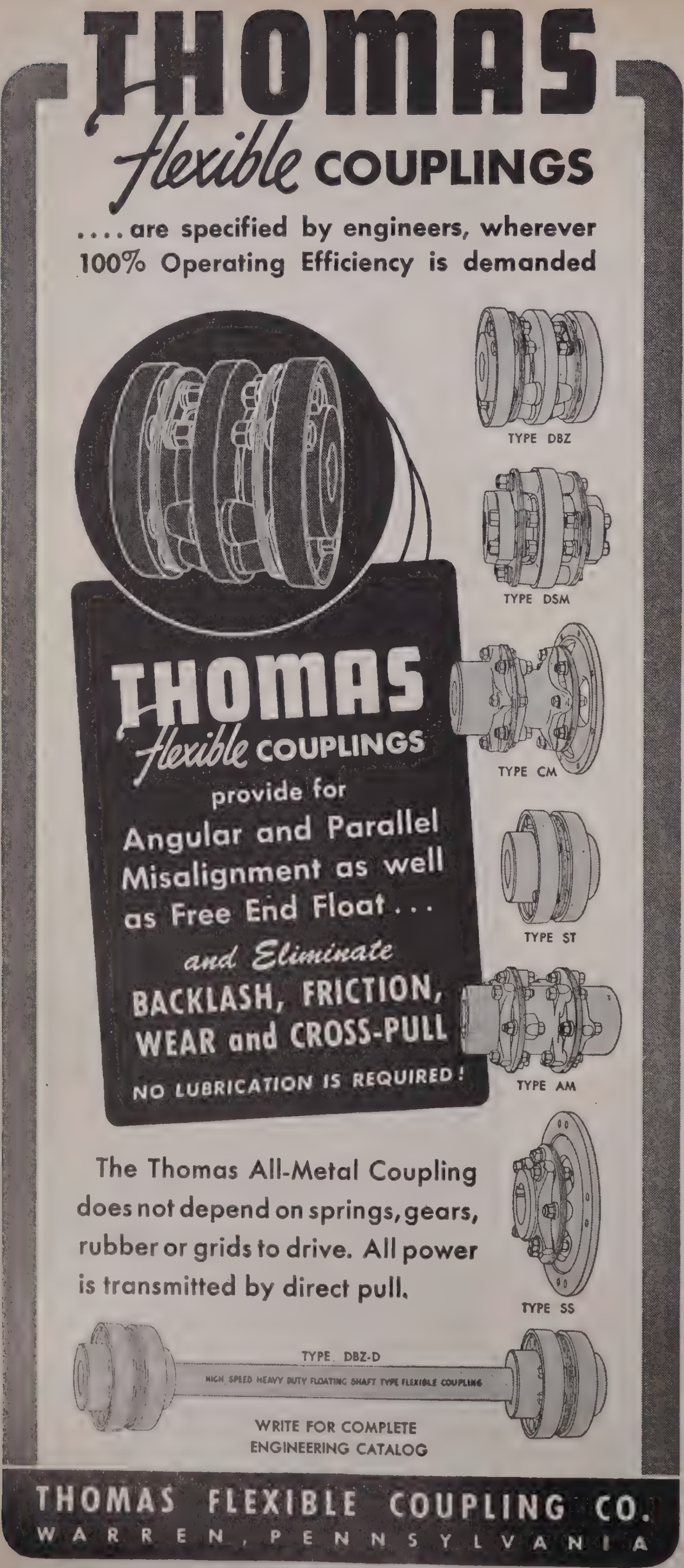
SHAPE STRAIGHTENERS . . . SHEARS . . .
LEVELLERS


THOMAS *Flexible* COUPLINGS

....are specified by engineers, wherever 100% Operating Efficiency is demanded

THOMAS *Flexible* COUPLINGS provide for Angular and Parallel Misalignment as well as Free End Float... *and Eliminate* BACKLASH, FRICTION, WEAR and CROSS-PULL

NO LUBRICATION IS REQUIRED!

The Thomas All-Metal Coupling does not depend on springs, gears, rubber or grids to drive. All power is transmitted by direct pull.

WRITE FOR COMPLETE ENGINEERING CATALOG

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

(CONTINUED FROM PAGE 161)

82,787 metric tons compared with 78,400 tons in August.

These increases are attributed to increased importations of iron ore and coking coal and increased domestic coal production. Most of the ore is from China, Malay and Hainan Island. Coal is being received principally from the United States, Canada and Sakhalin Island. About 270,000 tons of Brazilian iron ore were recently purchased.

The planned production of steel was 1,200,000 tons but it may not reach much, if any, over 1,000,000 tons. This compares with prewar production of upward of six million tons, including Manchuria.

The first of a group of American iron and steel industrial experts requested by SCAP to aid in improving the quality and quantity of steel production in Japan has arrived. The first arrival was J. W. Lowell who has been with Carnegie-Illinois Steel Corp. at Gary for the past 17 years. Mr. Lowell is an authority on hot strip rolling mills. He will spend three to six months in Japan, principally at the Yawata Works of the Japanese Iron and Steel Co. Other experts in such fields as blast furnace, openhearth and metallurgical operations are also to be sent to Japan.

As to scrap, a recent survey by the Iron and Steel Bureau of the Ministry of Commerce and Industry disclosed that about 3½ million tons of iron and steel scrap is available in Japan, of which about 900,000 tons are in yards at the steel mills. Japan has been offering some scrap for export but only alloy grades, no carbon steel scrap.

A.S.W.A. Adds Members

Cleveland

• • • **Seven new members** have been added to American Steel Warehouse Assn., according to Walter S. Doxsey, president. New members are: Bowsteel Distributors Corp., Linden, N. J.; Brass & Copper Sales Corp., Indianapolis; Jacklin Steel Supply Co., Lansing, Mich.; A. J. Schill Co., Houston; Stack Steel & Supply Co., Seattle; Universal Steel Co., Cleveland, and White Steel Warehouse Co., Rockford, Ill.

SOUNDNESS* is Essential

In Metal-Cutting Tools

In Money Tools

*"**Freedom from flaw or defect; firmness, strength, trustworthiness.**" *Webster*

Cemented carbide tools have been a boon to metal-working industries in their ability to increase production and decrease costs. To do this consistently and at minimum expense for maintenance, they must have soundness and uniformity. These properties are attained to a marked degree in Kennametal by distinctive processing and precise laboratory control throughout every stage of manufacture—from refinement of raw materials to sintering of finished product.

A sound, close-grained physical structure, free from porosity, characterizes all Kennametal compositions—a guarantee of uniform hardness and strength. Superior tool performance is therefore obtained. Reliability and durability are outstanding.

There are eight different grades of Kennametal, and a wide range of tool sizes from which to make selection for specific machining requirements, as listed in Catalog 48. You can buy Kennametal tools and blanks with assurance of highly satisfactory service. They are all efficient performers—money savers on production and maintenance.

Money—important tool of industry and trade—is an instrument for accurately evaluating the worth of goods and services in exchange activities only as it remains firm and trustworthy.

For 15 years we have had "managed" currency, and with it has come uncontrollable inflation. Dollars are plentiful, but "porous". The cost of living—for families and business concerns—has skyrocketed. Uncertainty prevails.

Return to sound money—an honest medium of exchange★—will help stabilize our economy, put a curb on the potentially infinite use of currency, automatically check inflation and dangerous expansion of credit, and restore confidence. Individuals can then know with certainty the worth of earnings and savings; businessmen will be enabled to continue worthwhile enterprises with assurance. Palliatives may ease the pain of economic ills, but sound money is an effective cure.

KENNAMETAL
SUPERIOR CEMENTED CARBIDES
KENNAMETAL *Inc.*, LATROBE, PA.

★ **Bill H. R. 5031** introduced into the House of Representatives, January 20, 1948, by Congressman Buffet of Nebraska cited as the "Gold Standard Act of 1948."

A BILL

"To restore the right of American citizens to freely own gold and gold coins; to return control over the public purse to the people; to restrain further deterioration of our currency; to enable holders of paper money to redeem it in gold coin on demand; to establish and maintain a domestic gold coin standard; and for other purposes."

New fastening operation SAVES 14c PER UNIT

Holland Furnace Company cuts assembly costs with the ACME-MORRISON Metal Stitcher

The Holland Furnace Company, Holland, Michigan, used to spend almost 17½ cents per assembly to fasten asbestos cloth to a steel frame.

Now, with the Acme-Morrison Metal Stitcher, the company makes this same assembly at a cost of about 3½ cents, and the finished job is better because the stitches make a stronger fastening!

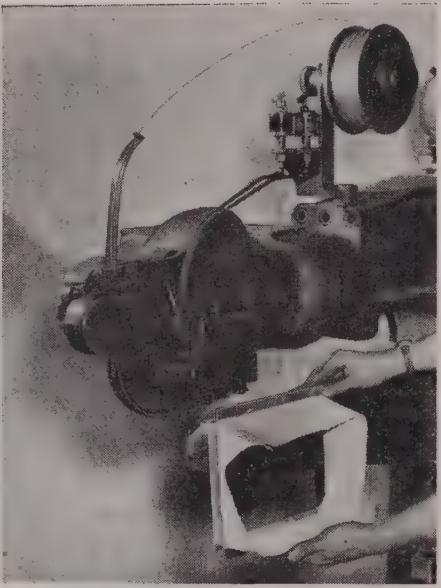
The biggest saving is in labor. With the old-type method (rivets), they made eight assemblies per hour. Using the Acme-Morrison Metal Stitcher, they have speeded production to 60 assemblies per hour.

Material costs have been cut, too. Formerly, the furnace company used 12 to 16 rivets per assembly at a cost of more than one cent per assembly. Now they use 15 to 20 zinc-coated aircraft-quality wire stitches, costing less than half a cent per frame.

You, too, may be able to save time and money with an Acme-Morrison Metal Stitcher. This modern machine fastens metal to metal or nonmetallic materials to metal. The secret is a wire stitch that works like your office stapler. No pre-punching is required. Acme-Morrison Metal Stitchers replace rivets, screws, nails, bolts, and spot welding.

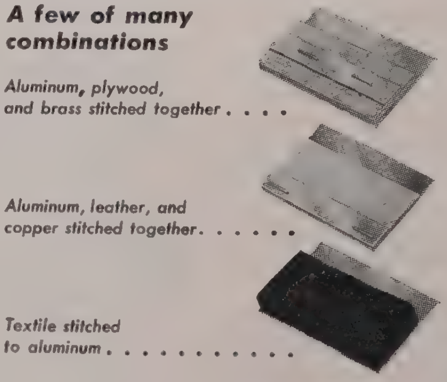
For further details about what this time-saving, money-saving Metal Stitcher can do for you, mail the coupon today.

STITCHING WIRE DIVISION
ACME STEEL COMPANY
NEW YORK 17 CHICAGO 8
ATLANTA LOS ANGELES 11



Operator uses an Acme-Morrison Metal Stitcher with a turned head to stitch asbestos cloth to a steel frame. The Holland Furnace Company has been using this method of assembly since 1946.

A few of many combinations


Aluminum, plywood, and brass stitched together . . . .
Aluminum, leather, and copper stitched together . . . . .
Textile stitched to aluminum . . . .

Cross-section view of a flat stitch

ACME STEEL COMPANY, Dept. IA-128
2840 Archer Avenue
Chicago 8, Illinois
Gentlemen:
Please send me further details about the Metal Stitcher.

Name..................................

Company..................................

Address..................................

City.................... State..........

Freight Cars on Order Fewer Than a Year Ago

Washington

• • • **All railroads** and private carlines had 111,405 new freight cars on order as of Nov. 1, 1948, according to the Assn. of American Railroads. The number on order on Nov. 1, 1947, was 126,213.

Of the total number, Class I railroads and railroad-owned and controlled private refrigerator car companies on Nov. 1, 1948, had 102,220 new freight cars on order. On Nov. 1, 1947, there were 109,467.

New freight cars on order by Class I railroads and railroad-owned and controlled private refrigerator companies on Nov. 1 this year were as follows: 20,568 box including 20,418 plain and ventilated and 150 automobile box cars; 46,211 hopper including 4173 covered hoppers; 22,681 gondolas; 4449 flat; 6935 refrigerator; 700 stock, and 676 miscellaneous freight cars.

Of the total number of new freight cars which Class I railroads had on order on Nov. 1 this year, 40,397 will be built in railroad shops and 61,823 in outside shops.

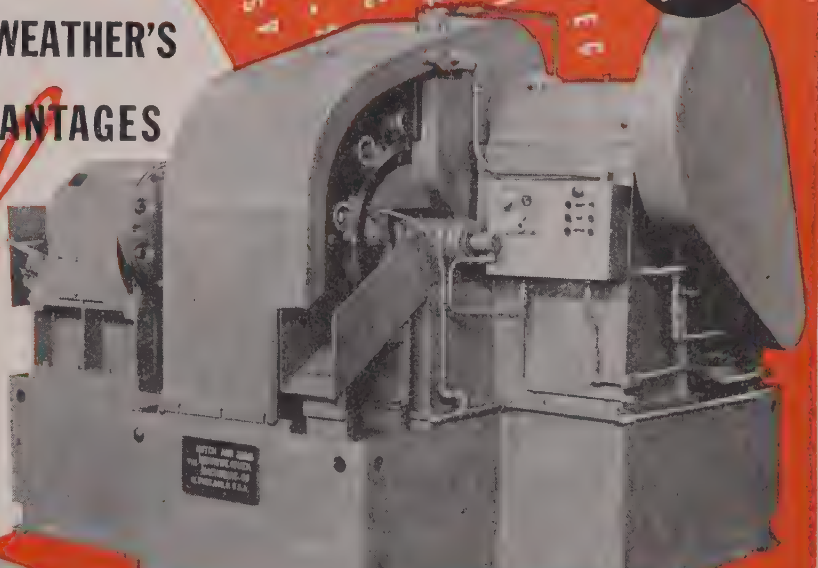
Class I railroads also had 1630 locomotives on order on Nov. 1 this year, compared with 967 on order on Nov. 1, 1947. The number for which orders had been placed on Nov. 1, 1948, included 86 steam and 1544 Diesel locomotives, compared with 45 steam, four electric and 918 Diesel one year ago.

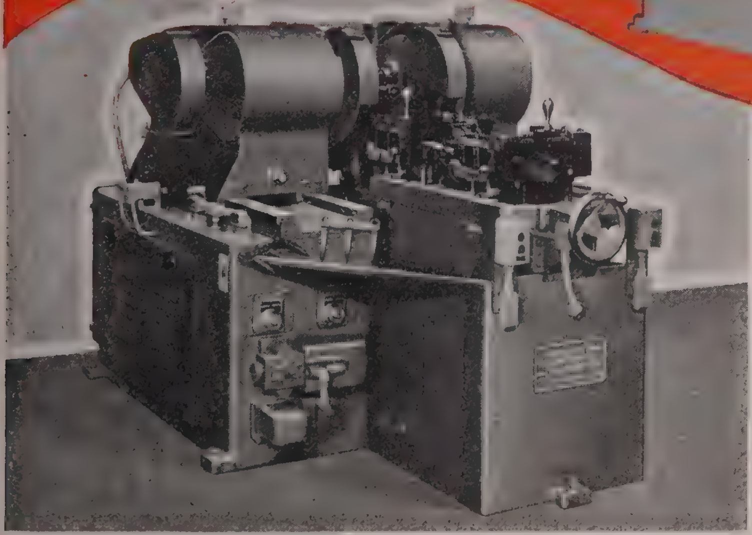
Class I railroads and railroad-owned and controlled private refrigerator car companies put 86,060 new freight cars in service in the first 10 months of 1948, compared with 46,308 in the same period in 1947. In the month of October, 1948, the railroads installed 8212 new freight cars. In October last year, 7736 new freight cars were put in service.

Those installed in the 10-month period this year were as follows: 35,714 box cars which included 34,450 plain and ventilated and 1264 automobile; 34,877 hopper including 1607 covered hoppers; 9097 gondolas; 5462 refrigerator; 153 flat; 350 stock and 407 miscellaneous freight cars.

You can get MOTCH & MERRYWEATHER'S TRIPLE-CHIP ADVANTAGES in *Special* CIRCULAR SAWING MACHINES

Triple-Chip METHOD





↑ **MOTCH & MERRYWEATHER SPECIAL PRODUCTION SAW MILLING MACHINE**

Two Triple-Chip Saw Blades mounted in opposite planes automatically saw sprues and risers off cast aluminum bearings. Production is limited only by loading capacity.

← **MOTCH & MERRYWEATHER SPECIAL SAW MILLING MACHINE**

No idle time! Saw-slot two forgings while loading two more. Similar variations can be developed for trimming ends of forging, removing gates and risers from castings, and other operations.

The five basic machines in the M. & M. line of circular sawing machines account for a surprisingly wide range of user needs—*but not all of them.* We are continually being asked to design adaptations and even new models which will "lick" unusual conditions. Two examples are shown.

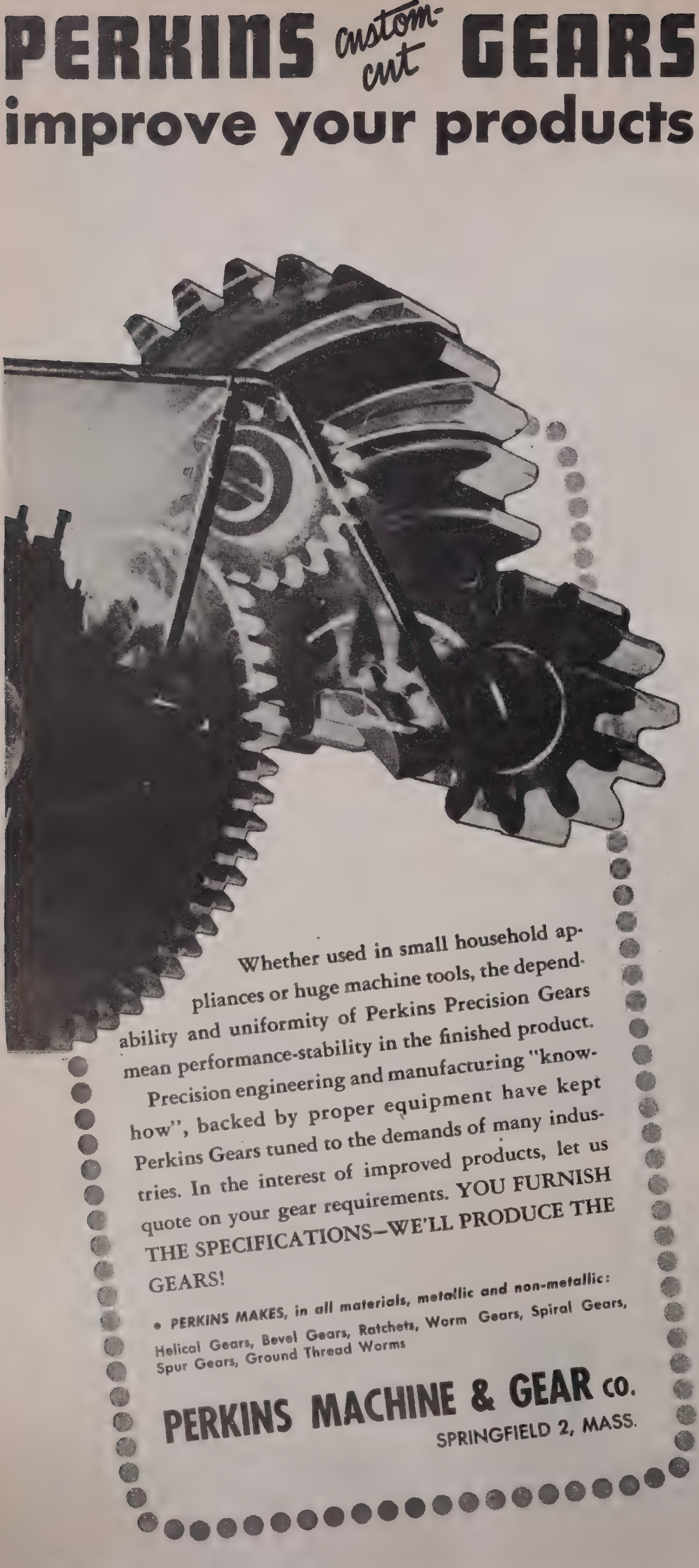
All the features of the Triple-Chip method are preserved. You profit from record-breaking speeds, easy operation, accurate lengths, cuts smooth and square, burrless ends, minimum scrap, and savings in labor, floor space and overhead. Second operations are often cancelled out.

Only M & M *builds*
ALL 3:
CIRCULAR SAW
SAW BLADE
BLADE GRINDER

What, sir, are your requirements?

THE MOTCH & MERRYWEATHER MACHINERY CO.
PENTON BUILDING • CLEVELAND 13, OHIO

AT YOUR COMMAND • AN UNPARALLELED EXPERIENCE IN CIRCULAR SAWING



PERKINS *custom-cut* GEARS improve your products

Whether used in small household appliances or huge machine tools, the dependability and uniformity of Perkins Precision Gears mean performance-stability in the finished product. Precision engineering and manufacturing "know-how", backed by proper equipment have kept Perkins Gears tuned to the demands of many industries. In the interest of improved products, let us quote on your gear requirements. YOU FURNISH THE SPECIFICATIONS—WE'LL PRODUCE THE GEARS!

- *PERKINS MAKES, in all materials, metallic and non-metallic:* Helical Gears, Bevel Gears, Ratchets, Worm Gears, Spiral Gears, Spur Gears, Ground Thread Worms

PERKINS MACHINE & GEAR CO.
SPRINGFIELD 2, MASS.

Build Slag Fuming Plant To Recover Zinc Residue

Toronto

• • • **Hudson Bay Mining & Smelting Co. Ltd.** has started construction of a slag fuming plant for the recovery of zinc in zinc plant residue and in reverberatory furnace slag at Flin Flon, Manitoba. The plant will treat the slag from the operation of its present reverberatory furnace after substitution in the charge of a tonnage of zinc plant residue containing gold, silver, copper and zinc, for a considerably lesser tonnage of displaced copper calcines.

It is estimated that up to 300 tons of residue per day can be so treated without modification of the present furnace and that the fuming plant and necessary addition to the present electrolytic zinc plant will be completed in 1950. The cost of the plant will be between $5 million and $6 million. Of late years the company has been stockpiling its zinc plant residue at the rate of about 60,000 tons annually, and at the begining of 1947 there were 700,000 tons in the stockpile.

In the new process, on which the company's research staff has been working for several years, both concentrates and residues will be run through the smelter and the smelter slag will be put through the fuming plant to recover the zinc both contained in the residue and in the reverberatory slag.

Time Capsule Stops The Clock on Railroading

Chicago

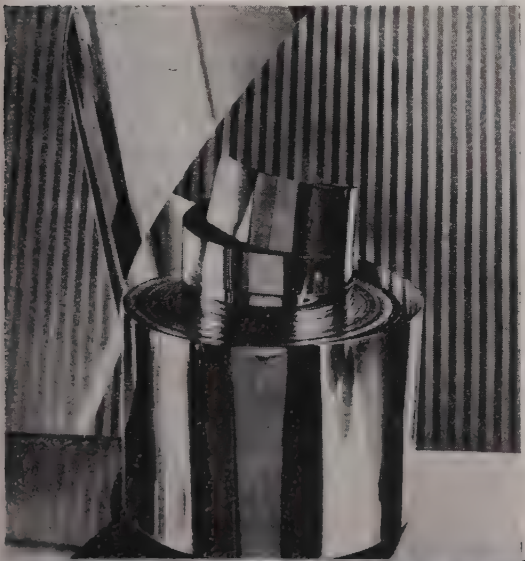
• • • **Predictions of railroading a** century hence were disclosed in Chicago on Oct. 25 when a time capsule concrete cube was buried in the earth at the exact site of Chicago's first rail depot. The time capsule "stops the clock" on railroading in 1948 and contains photographic documentation of operations as they exist today. The capsule also contains written predictions by designers and news analysts on how the world will look in 2048.

"Sampler" Portfolio Offered by Plated Metal Manufacturer

NOTHING speaks as loudly in praise of a product as a sample of the product itself, and this is certainly true of the gleaming, highly polished metals in various finishes and patterns that comprise the Nickeloid Metals line. The manufacturer of these metals. American Nickeloid Company, has just prepared a new portfolio showing representative samples of the metals themselves. They call it "The Sampler." These metals. available in sheets or in coils. comprise finishes of chromium, nickel, copper or brass, pre-plated to such common base metals as copper. brass, steel, zinc, or aluminum.

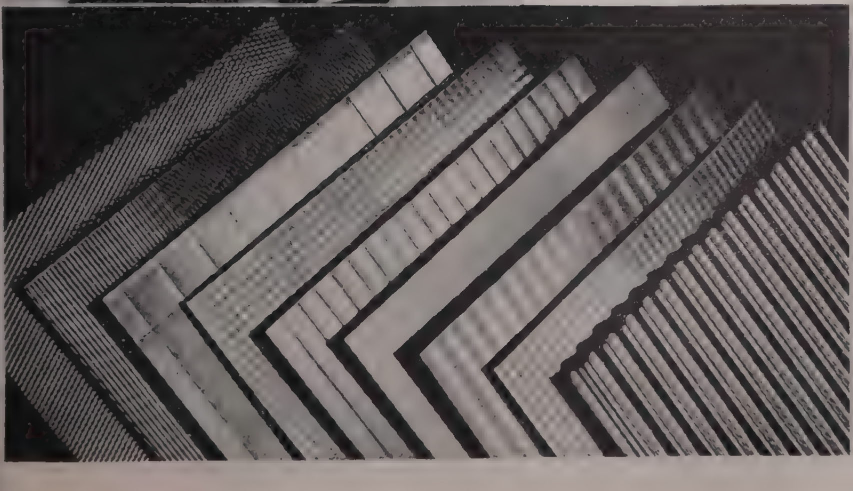
for Sparkling Beauty
QUALITY...UTILITY
Use
Nickeloid
PRE-PLATED
Metals

Designers, manufacturers, production men may have a copy of "The Sampler" free by writing on their company stationery and asking for Booklet No. 2.



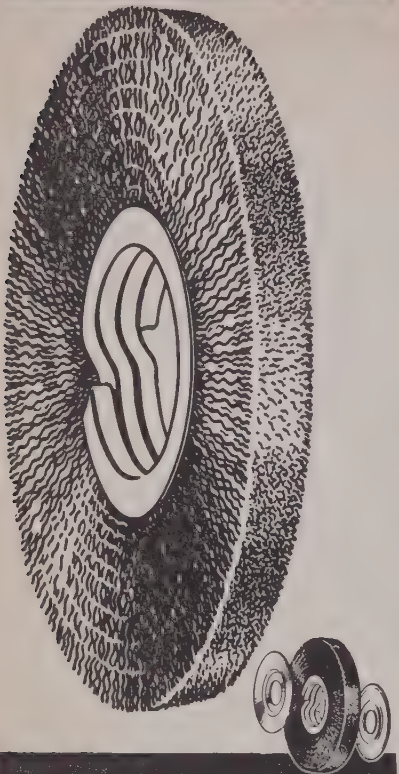
Many people think that plated parts are always stamped and then individually plated. Hundreds of Manufacturers use Nickeloid pre-plated Metals in sheets or coils — stamp or form the parts — then assemble, without further polishing, plating or finishing. There is a basic economy in the use of Nickeloid pre-plated Metals which we would be glad to explain further.

Not only are Nickeloid Metals sampled in bright and satin finish plain metal, but in interesting crimps and stripes. Industry has found wide use for these pre-finished metals.



AMERICAN
NICKELOID
COMPANY
Established 1898
PERU, ILLINOIS

Easy Installation
Economical Replacement



FULLERDISC

WHEEL BRUSHES

Combination adapter side plates make Fullerdisc wheel brushes easy to install. Quick, too. The same combination is also responsible for cutting costs because *only* the brush section need be replaced. You buy side plates just *once.*

Fullerdiscs are adapted to fit shafts from ½" to 1". Brush diameters range from 5" to 9" in a choice of materials. For complete specifications send for new folder "Fullerdisc Wheel Brushes" Write today to . . .

The FULLER BRUSH CO.

FULLERGRIPT
ENGINEERING DIV.
3628 MAIN ST., HARTFORD 2, CONN.

New York University Gets New Research Contract

New York

• • • A **research** contract has been awarded to the New York University College of Engineering by the Watertown Arsenal covering the development of titanium-carbon and titanium-nitrogen phase diagrams, according to Professor E. N. Kemler, acting research director at the college.

The work will be under the direction of John P. Nielsen, associate professor of metal science, and will have for its primary objective the investigation of different compositions and heat treatments for these alloys to evaluate them for structural applications.

The new contract is the latest addition to an expanding research program at University Heights which now includes work on jet and rocket propulsion, development and evaluation of artificial limbs, investigations on spectroscopy and cosmic rays, studies of atmospheric energy and circulation, and development of constant-level balloons.

Other projects of industrial significance involve aeronautical investigations of compressible flow, supersonics and smoke dispersion; chemical studies on one-coat paints and tower packing materials; work on soil trafficability and on water purification and sewage disposal; rating of time studies; work with heat pumps and mechanical vibrations; and studies in electronics and communications.

Western Metal Congress Planning Shaped by ASM

Cleveland

• • • **The Western** Metal Congress and Exposition will be held in the Shrine Civic Auditorium, Los Angeles, for five days starting Apr. 11, according to an announcement by W. H. Eisenman, national secretary, American Society for Metals, and managing director of the event.

Mr. Eisenman said more than two-thirds of all available space has already been assigned to metal producers and fabricators for the Western Show.

"This is the largest pre-convention exhibitor reservation of all

FOR SALE
MACHINE TOOLS

Immediately Available
Due To
Production Change-over

● Most of these tools have been purchased since the war and are in excellent condition. They are all still on our production line at our Cleveland plant. They can be purchased direct from us at substantial savings.

Included in this lot are:

- **ARBOR PRESSES**
- **AUTOMATICS**
- **BORERS**
- **BROACHES**
- **DRILL PRESSES**
- **GRINDERS**
- **HONERS**
- **LATHES**
- **MILLING MACHINES**
- **POWER PRESSES**
- **RADIAL DRILLS**
- **SCREW MACHINES**
- **WELDERS**

and many other items too numerous to list here. All tools offered subject to prior sale.

Write for Catalog

THE COLUMBIA
AXLE COMPANY
8300 Baker Avenue
CLEVELAND 2, OHIO
Telephone: ATlantic 2400

FOSTER'S

A COMPLETE
WAREHOUSE
SERVICE
SINCE 1902

Write for Folder F-107

RAIL • TRACK ACCESSORIES TRADE MARK **PILING • PIPE • WIRE ROPE**

SINCE 1902

L. B. FOSTER COMPANY

PITTSBURGH 30 • NEW YORK 7 • CHICAGO 4 • HOUSTON 2 • SAN FRANCISCO 4

Five convenient warehouses for prompt delivery

SMALL STAMPINGS

Any Metal
Any Quantity
•
30 years' experience
gives us the
"know how"

Hundreds of satisfied customers are evidence of our high quality.

THE
MASTER PRODUCTS
COMPANY
6400 PARK AVE. • CLEVELAND 5, OHIO

the previous five Western Shows," Mr. Eisenman revealed. "The importance to the Western audience and to the metal producer and fabricator in every section of the country is indicated by this enthusiastic reaction. The Western Metal Congress and Western Metal Exposition is now certain to surpass any previous convention on the West Coast, both in attendance and in the value to the metals industry there."

The Congress and Exposition in Los Angeles will again be under the auspices of the American Society for Metals. Cooperating with the ASM will be the Western sections of 20 other national technical societies, bringing in an attendance of over 10,000 engineers and technicians who are members of these groups.

Construction in October Showed Slight Decrease

Washington

• • • **October construction** activity declined slightly to $1.7 billion, bringing the dollar volume for the year to a total of $14.7 billion, according to the Bureau of Labor Statistics.

Industrial building continued to lag behind while commercial construction (stores, warehouses, etc.) still exceeds last year's volume. Construction employment has dropped off by about 6 pct to 2,217,000 workers.

Continuing the decline which started last June, 72,000 new permanent dwelling units were started during October, according to preliminary estimates.

Despite the apparent slacking off, the 1948 total seems likely to exceed substantially that of last year—849,000 units. The total for the first 10 months stands at more than 810,000 as compared with 710,000 for the same 1947 period.

The percentage of rental-type construction, of two-family and multiple-family units, is rising, the BLS notes. About 20 pct of the units built so far this year are for rental use as compared with 14 pct for the last half of 1947.

Heaviest construction volume continues on the West Coast and Southwest with Los Angeles leading all other cities in total units started and New York is second.

"it DOES make a Difference..."
what
SHIM STOCK
YOU USE

Save
✓ TIME,
✓ WORK,
✓ WASTE

Specify
PRECISION BRAND

Prove to yourself that you can *save* and get better results with the right shim stock when you can be sure of uniform quality, guaranteed accuracy, convenient protective packaging with Precision Brand. Select from a complete line — Brass Shim or Shim Steel in Dispenser Cartons; Four-in-One Assortment or Flat Packets of Die Cut. Send for Catalog Sheet.

EASY-TO-USE MUSIC WIRE

Just pull, cut, replace end! It's a time-saving dispenser carton for top quality Music Wire, available on immediate delivery in thicknesses .004" to .180". Also in bulk.

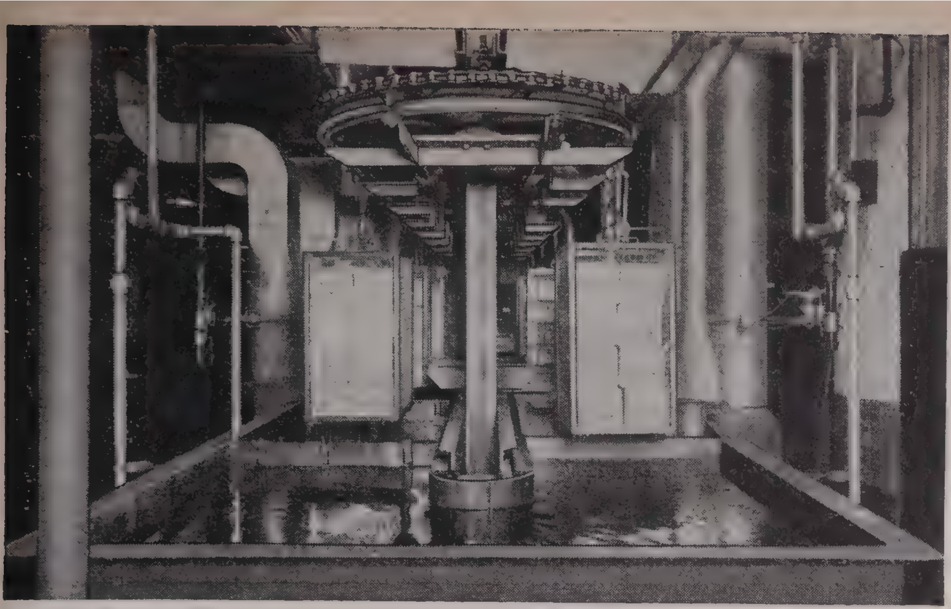
GROUND FLAT STOCK

A complete line in both oil and water hardening types, precision ground to within .001"—ready for scribing, shaping, tempering, drawing. Each piece oiled, wax wrapped in protective envelope; marked with size, heat treatment.

CONSULT YOUR JOBBER

GROUND FLAT STOCK
BRASS SHIM
MUSIC WIRE
PRECISION BRAND
DRILL ROD
SHIM STEEL
THICKNESS GAUGE STOCK

PRECISION STEEL WAREHOUSE, INC.
MANUFACTURING DIVISION
4409 WEST KINZIE ST., CHICAGO 24, ILL.



How would YOU have solved this metal-finishing problem?

The Story: Because of shortages of steel, Minneapolis-Honeywell decided to use aluminum for its regulator covers. But this change introduced a knotty problem . . .

The Problem:

Since aluminum does not bond paint to itself firmly, a process had to be worked out by M-H engineers to inactivate the metal's surface and permit an adherent paint-to-metal bond. This process involves several cleaning, rinsing and chemical-bath operations before painting can be done. *How to turn out regulator covers in mass production—involving this multiple-stage process?*—that was the problem.

The Solution:

"Why not adapt a Udylite Fully Automatic Plater?" the researchers asked. "This isn't an electrolytic process, to be sure, but it does involve certain chemical-bath operations which must proceed *continuously* and be timed *accurately*." So they did. With these results:

1. *The Udylite plater's fully automatic mechanism provided the* continuous *production-line processing needed.*
2. *The Udylite machine's hydraulically-actuated immersion mechanism made it possible to adjust the speed of immersion and withdrawal of the work* individually *and* accurately *to the requirements of the individual run.*
3. *Straight-up-and-down raising and lowering of the work saved 18" to 24" of tank per transfer, prevented "floating off," and assured adequate drainage of solution from work parts.*
4. *MASS-PRODUCTION WAS ACHIEVED; THE MACHINE TURNS OUT 25,000 REGULATORS PER HOUR.*

Is yours a problem involving automatic plating? better finishing? more output?

If so, call in the Udylite Technical Man, describe your problem and the results you want, and let him make recommendations. Udylite produces a complete line of plating and metal-finishing equipment—barrel platers, rectoplaters, Fully Automatics, Semi-Automatics, etc.—and laboratory-tested supplies. Our metal-finishing specialists will plan the most efficient process for your operations —without obligation. Call or write us today.

THE
Udylite
CORPORATION

PIONEER OF A BETTER WAY IN PLATING

DETROIT 11, MICHIGAN

Here's
Efficient
Welding
...On
C-F
Positioners

When heavy, unwieldy weldments like these diesel crankcases can be quickly swung into any position so that every weld is made *downhand*—that's efficient welding!

Welders spend more time welding—do better welding at lower cost when they work with C-F Positioners because these hand and/or power operated machines reduce positioning time to a minimum. Investigate the cost-saving advantages of C-F Positioners. They pay their way in any company.

Write for Bulletin WP24—an illustrated circular detailing the *Specific* advantages of C-F Positioners.

CULLEN-FRIESTEDT CO.
1303 S. Kilbourn Ave., Chicago 23

CULLEN-FRIESTEDT CO., CHICAGO 23, ILL.

C-F positioned welds mean better, more economical welds

THERMOSTAT
Perfex Twin
CONTACT CONTROLS
STEWART-WARNER'S NEW
South Wind
TRAILER HEATER
SQUARE D
For Reli
Therm
TRUMBULL
Residential
Multi-Breakers
CHACE
THERMOSTATIC BIMETAL

WE'RE TELLING THE WORLD!

WE'RE PROUD of the diversified controls, instruments, appliances and other temperature-responsive devices which use Chace Thermostatic Bimetal as the actuating element. Every issue of many industrial journals tells product engineers who specifies Chace Thermostatic Bimetal, and how – and why! Look for this informative series of Chace advertisements. It may suggest new uses of thermostatic bimetal in your products.

W. M. CHACE COMPANY
Manufacturers of Thermostatic Bimetals
1604 BEARD AVE. • DETROIT 9, MICH.

Huge Savings Possible In Government Buying By Simplified Method

Washington

• • • **The Federal** Governmen stands to have about $250 millio a year if it will simplify the methods by which it buys military an civilian supplies.

This prediction was made her last week by Herbert Hoover chairman of the Commission o Organization of the Executiv Branch of the Government. Th commission expects to submit it full report to Congress by Jan. 13 1949.

Coordinated procurement methods also would result in a $2.5 billion reduction in inventories, i addition to the annual $250 millio saving in administration, the commission predicts.

At present, according to Mr Hoover's group, there are five underlying deficiencies in government supply operations. Thes are:

1. There is no wide recognition of supply as an importa executive function. There is n comprehensive government-wid system that gives adequate emphasis to the many phases o supply—purchase, storage an issue, disposal, utilizatio transportation, specification, inspection and identification.

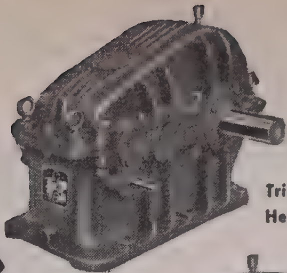
2. A maze of laws and regulations surrounds the whole process with unnecessary red tap The emphasis of the laws is no on promoting efficiency an economy but upon preventin fraud. Over-regulation encourages routine buying, prevent economy and the exercise of initiative.

3. This failure is reflected i organization, in appropriatio and administrative systems, an in personnel classification an salaries. Although purchasin is a highly-skilled professio that requires intimate knowledge of trade conditions an markets, salaries paid in government are inadequate for professional competence.

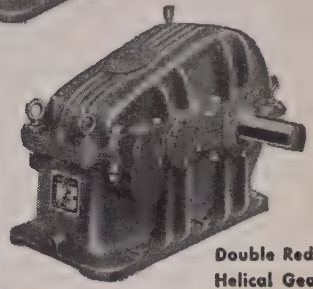
4. Advance schedules of buying are inadequate. Purchasin officers do not participate to th necessary degree in budget an operations planning.

5. There is vastly different em-

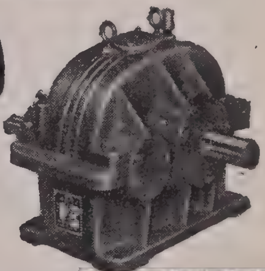
NEW and BETTER DRIVES *for American Industry!*



Triple Reduction Helical Gear Unit



Double Reduction Helical Gear Unit



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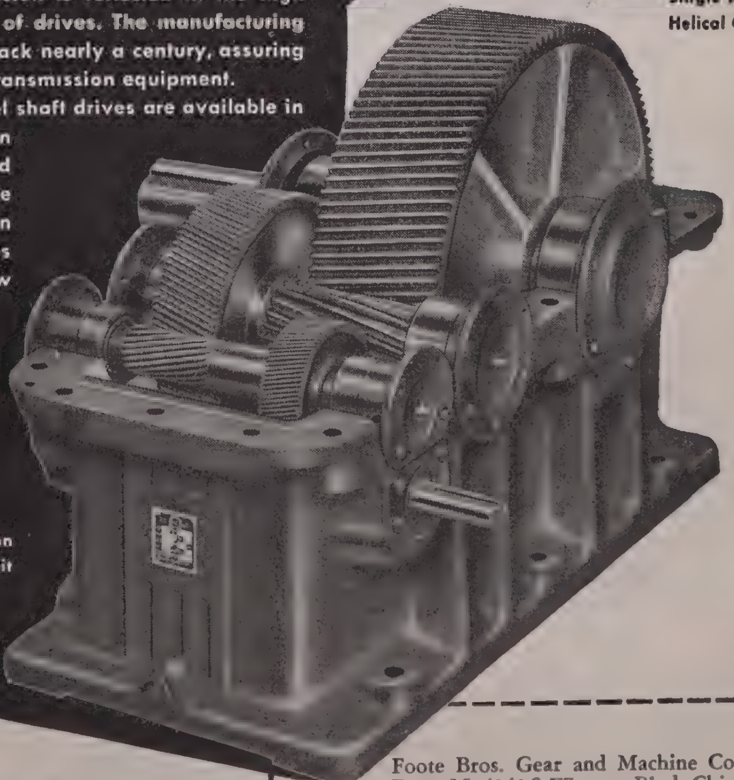
The experience gained by Foote Bros. engineers in producing gears of almost laboratory precision is reflected in the high quality helical gears in this line of drives. The manufacturing experience of Foote Bros. dates back nearly a century, assuring industry the last word in power transmission equipment.

Foote Bros. Maxi-Power parallel shaft drives are available in single, double and triple reduction types in a wide range of sizes and ratios to meet practically any service need. An advance information sheet giving dimensions and ratios is available. Mail the coupon below for your copy.



Triple Reduction Helical Gear Unit

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Better Power Transmission Through Better Gears

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Foote Bros. Gear and Machine Corporation
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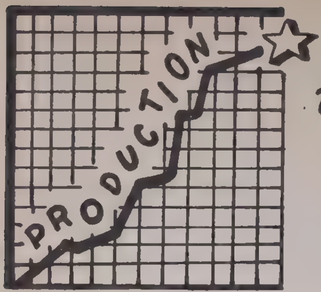
Please send me information on dimensions and ratios for Foote Bros. Maxi-Power Gear Drives.

Name..

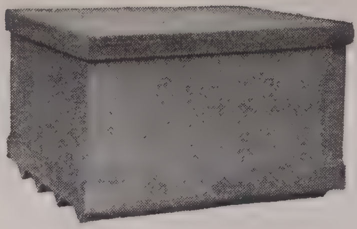
Company..

Address..

City...*State*.......



Exact! Weight/Strength RATIO



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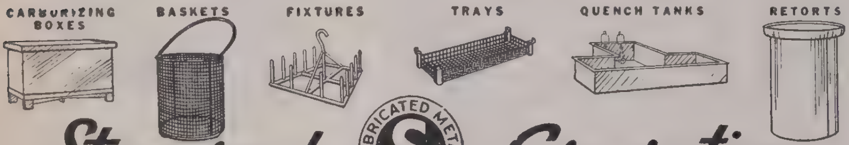
Handle more parts per load to boost production and reduce unit costs. Stanwood Engineering is automatic assurance of top to bottom design that holds weight to a minimum without sacrificing strength. The all-fabricated carburizing box shown is STANWOOD-DESIGNED to resist high temperatures and corrosion and to stand up under the roughest handling. Yet it is extremely lightweight for BIG payloads. There are no corner welds . . . Long-life V-skids on bottom permit free air circulation Send for catalog 16 describing Stanwood baskets, trays, fixtures, retorts and carburizing boxes.



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... for cutting bulky scrap

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phasis in regulation of the eight different mutually dependent operations that make up the supply function. Purchase and disposal are heavily regulated. Storage and issue, and utilization of surplus inventories, receive little attention. Traffic management is largely neglected. Inspection for quality is almost nonexistent in civilian purchasing. Specifications are not well drawn, or standardized. Items of property are identified under 17 different systems of nomenclature that vary even within individual agencies, so that a single type of ball bearing, for example, has 239 separate designations.

In addition to Mr. Hoover, the members of the commission are Dean Acheson, former Under Secretary of State, vice-chairman; Senator Aiken, Republican, of Vermont; Representative Clarence J. Brown, Republican, of Ohio.

Process Reduces Wear On Low Pressure Tires

Detroit

• • • **Passenger car** tires produced by the "cold rubber" process may be the answer to the wear problem on the new low pressure tires.

According to an announcement from Akron this week "cold rubber," made at temperatures lower than those used in the manufacture of standard rubber, has shown up impressively during exhaustive wear tests.

According to Goodyear officials, the new tires will bear no special markings. Production of the new tires is still limited but government-owned rubber plants now are being converted to turn out the improved general purpose material during 1949.

The new rubber is reported to have been developed by researchers of the B. F. Goodrich Co. shortly before World War II. Early patents were turned over to government when all the rubber companies entered a patent-pooling agreement at the request of government officials.

It is known that several rubbe producers are preparing to mak substantial quantities of tires produced by the "cold rubber" metho available to the auto industry dur ing 1949.

(CONTINUED FROM PAGE 182)

the continued survival of existing plants.

(4) New England has characteristically been a marginal market for the output of large-scale efficient steel producers in neighboring states. In periods of slack steel demand price competition from these and European suppliers has been intense. The diversity of New England steel demand further argues for drawing on the production of large-scale specialized mills outside the region.

(5) The trend of New England industrial production has been toward small organizations in light manufacturing with emphasis on entrepreneurial talent and skilled workers. Basic metals production in New England does not appear as fruitful a use of the talents and resources of the region as does the continued exploitation of this evolutionary growth.

(6) The permanence of export markets for steel is not sufficiently assured to justify a heavy fixed investment at the present time which would depend heavily on export business for its success.

(7) Expansion of existing or additional nonintegrated mills appears to be a more promising development of New England's needs and resources than a single large integrated mill.

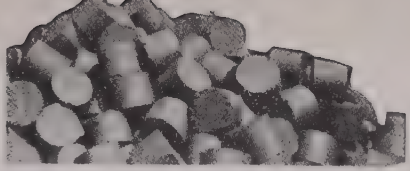
It may well be that this latest survey answers once and for all the perennial debate as to New England's ability to support an integrated mill. Nobody can blame the New England Council and other industry groups for trying. But if the Institute's engineers are right, the best line of action for the Council is to plug the nonintegrated mills and find new customers for them.

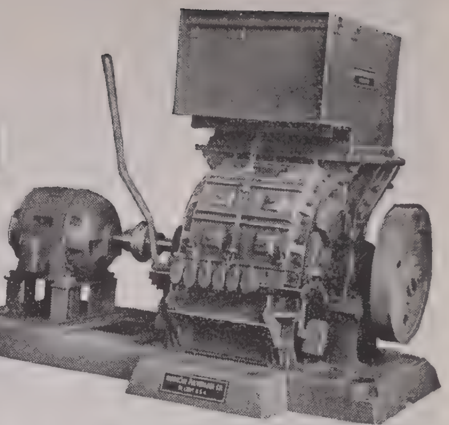
Enlarges Study Bases

Los Angeles

• • • **Working without** fanfare, the Navy gradually is increasing its activity in southern California (11th Naval District) and is enlarging many of its scientific study bases.

The two major ship repair yards operated by the Navy in Long Beach and San Diego still are below their wartime peak of productivity but are keeping their docks full.





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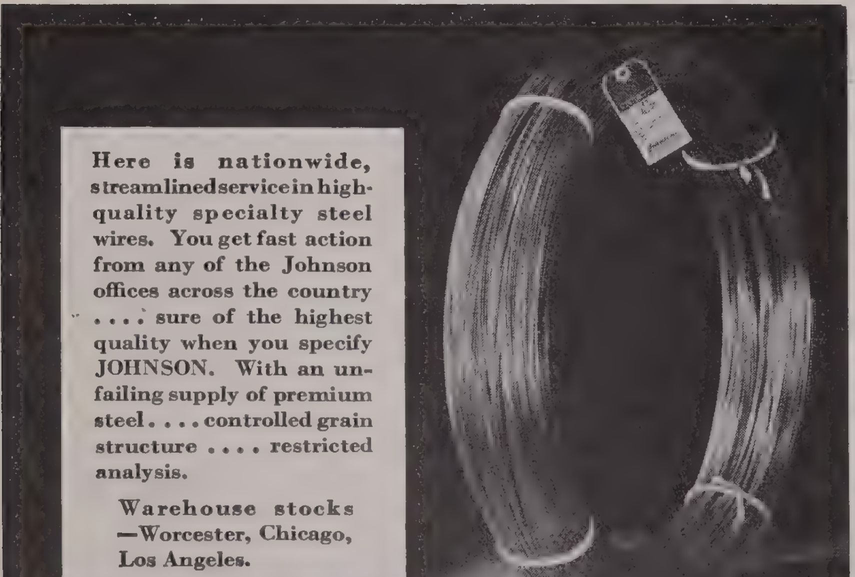

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Neutrons May Provide New Eyes to Observe Processing of Metal

New York

• • • **Neutrons may** provide industry with new eyes for scrutinizing the processing of metals, Professor T. Ivan Taylor of Columbia University told a symposium held here recently by the American Chemical Society's New York Section.

The conspicuous appetite of many of the heavier metals for neutrons traveling at certain speeds serves to identify the metals and to tell accurately in what amounts they are present, according to Professor Taylor, who defined neutrons as subatomic particles without electrical charge.

This phenomenon, known as resonance absorption, might be applied to measure the thickness of gold, silver, or cadmium plating, he suggested, pointing out that an automatic machine could be designed and installed on assembly lines for this purpose.

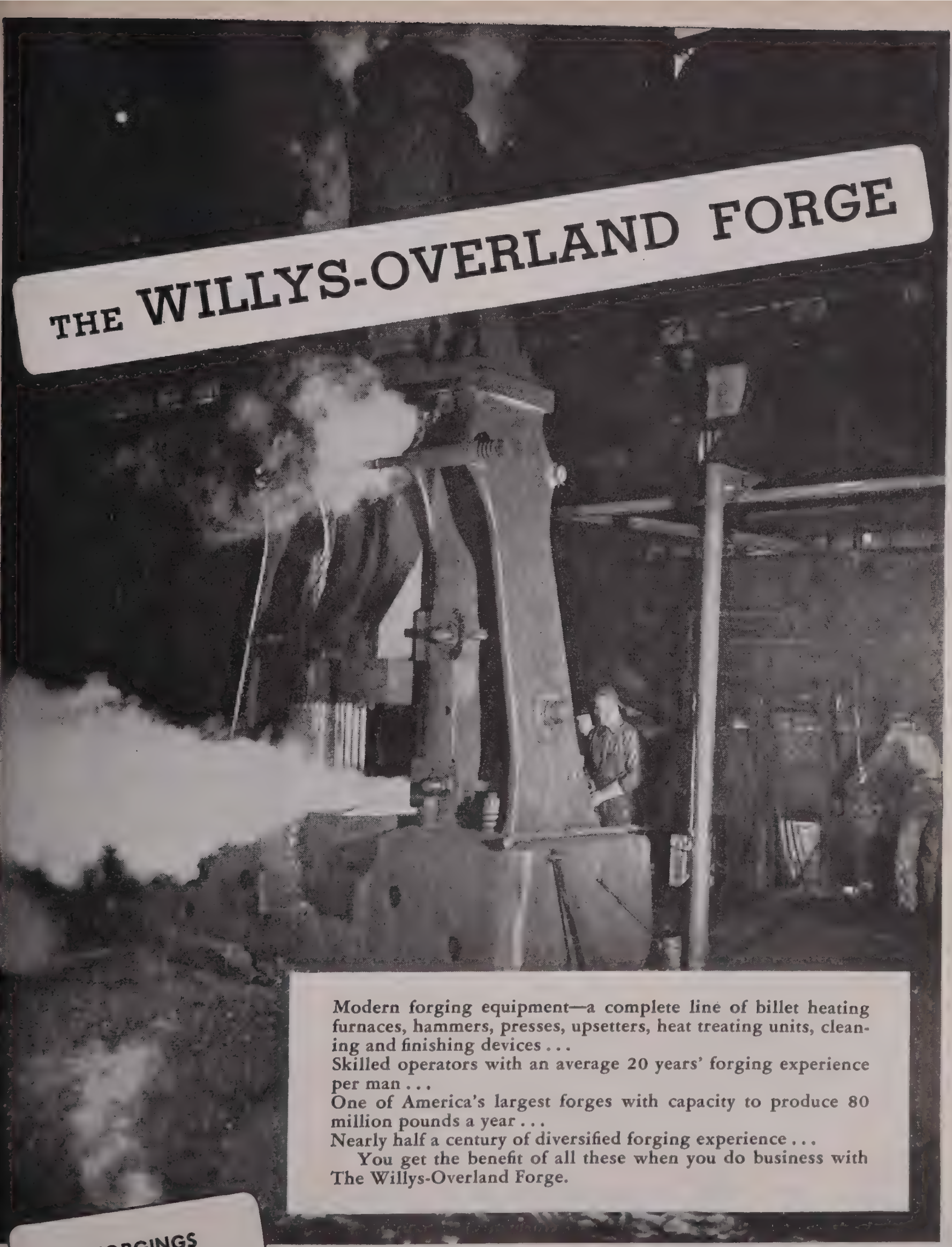
Another likely application would be the detection of trace amounts of the metal indium in tin, Professor Taylor said. Although for most purposes impurities of indium would be of little consequence, they might well make tin solder unsuitable for use near cyclotrons, atomic piles, and other generators of nuclear energy, he stated.

The indium would act as a "sink" for neutrons, making the solder itself radioactive and a potential health hazard, it was explained.

Running checks on the amounts of manganese or cobalt in steel and aluminum could also be made by an instrument emitting neutrons with a velocity particularly attuned to absorption by manganese or cobalt, Professor Taylor noted, pointing out that these investigations, in which he has collaborated with Professor W. W. Havens of the Columbia physics department, will bear fruit only if suitable neutron sources become widely available.

Difficult chemical analyses, involving, for example, the hard-to-separate rare earth elements, can be performed simply through ob-

THE WILLYS-OVERLAND FORGE



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Nearly half a century of diversified forging experience . . .
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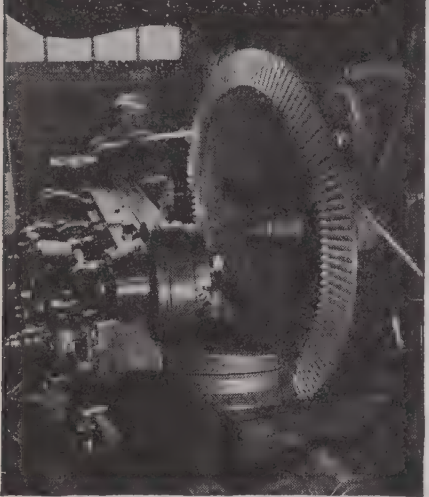
WILLYS-OVERLAND MOTORS, INC., TOLEDO 1, OHIO

LARGE INDUSTRIAL GEARS



Bevel and mitre gears up to 60" dia. are cut on gear planers to accurate tolerances.

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up to 145" diameter

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servation of neutron absorption, according to Professor Taylor, who said that the speed of neutrons can be regulated as desired.

By a different technique, measurement of the scattering of low speed neutrons, it is possible to determine the amounts of hydrogen remaining when hydrogen is replaced by fluorine in the manufacture of fluorocarbon compounds, which promise to be particularly valuable as flameproof construction materials in the future, he continued.

Will Repeat a 7-Month Course for Engineers Of Electric Utilities

Pittsburgh

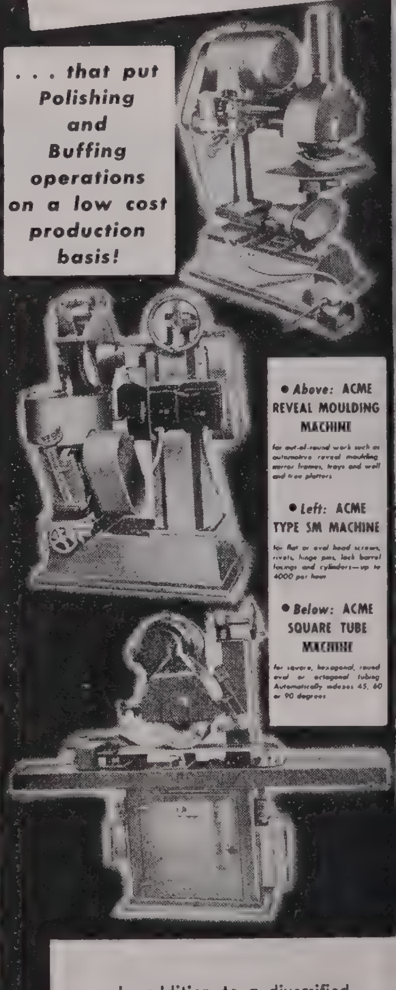
• • • A **7-month course** at Westinghouse in electrical transmission, distribution, and generation procedures for young electric power utilities engineers is accelerating the training of recent engineering graduates for utilities. Inaugurated in the fall of 1947 in cooperation with a few utility companies, the first course is proving so successful that it will be repeated.

The course is operated in a similar fashion to that conducted by Westinghouse for its own student engineers. The special students remain as employees of the utility companies throughout the program but participate in all social, athletic, and educational activities of the Westinghouse graduate student group.

The program includes lectures, actual production, design and test experience on generation, transmission, and distribution equipment and a full-time six-week course in central-station engineering. Graduate-level courses on symmetrical components and circuit theory are required.

The 1948-49 class will be limited to 25 recent engineering graduates who are employees of cooperating utilities. Men will be selected from areas over the United States in an attempt to spread the effects of the course as widely as possible.

3 of Many ACME special POLISHING and BUFFING MACHINES



. . . that put Polishing and Buffing operations on a low cost production basis!

• Above: ACME REVEAL MOULDING MACHINE
for out-of-round work such as automotive reveal moulding, mirror frames, trays and wall and tree platters

• Left: ACME TYPE SM MACHINE
for flat or oval head screws, rivets, hinge pins, lock barrel housings and cylinders—up to 4000 per hour

• Below: ACME SQUARE TUBE MACHINE
for square, hexagonal, round oval or octagonal tubing. Automatically indexes 45, 60 or 90 degrees

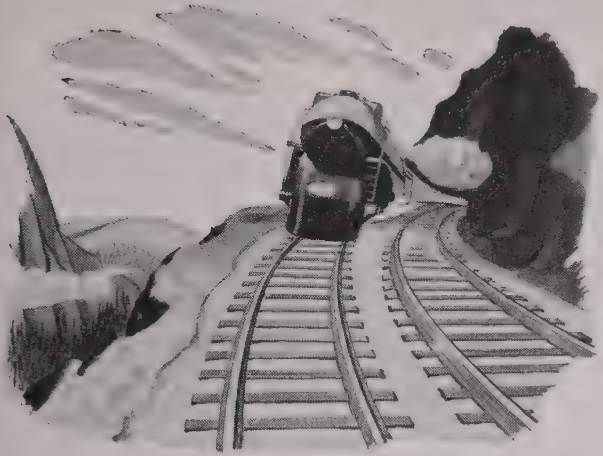
In addition to a diversified line of straight line, Rotary and Semi Automatic polishing and buffing machines, ACME produces many special machines engineered to handle unusual and difficult jobs on a production basis.

The three machines illustrated have demonstrated their efficiency on jobs difficult or impossible to handle with high production and low cost in any other way.

These or other ACME machines and arrangements may help solve *your* polishing and buffing problem.

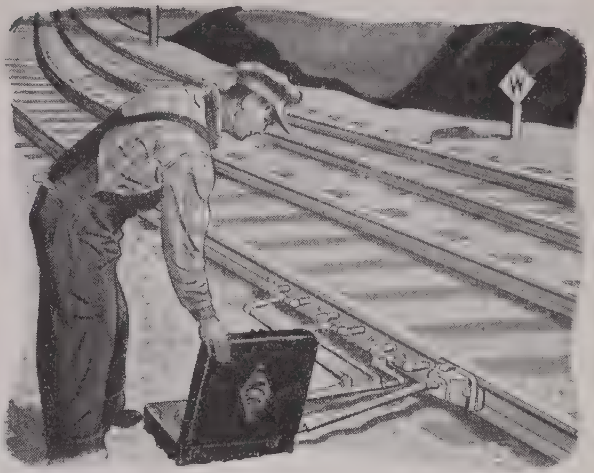
ACME Manufacturing Co.
1645 HOWARD ST. DETROIT 16, MICH.

Let Morse grease the rails for *your* tough jobs too!



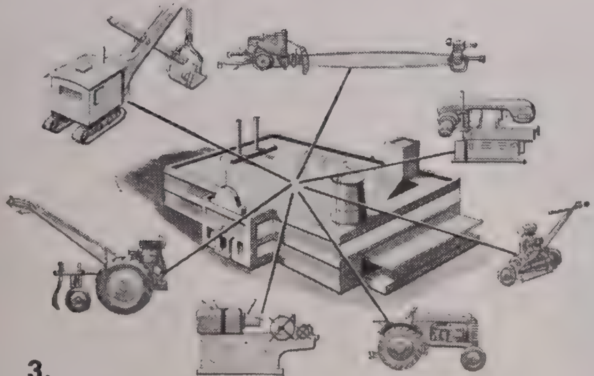
1.

Sc-r-r-ee-ch! Railroad men know this noise means that expensive train wheels and rails are wearing away on curves. To prevent this wear, automatic greasers were installed to lubricate wheels and rails. Old-style ratchet type clutches were tried, but slipped or didn't feed grease right. American Brake Shoe Company's Ramapo Ajax Division solved this knotty problem . . .



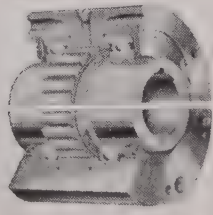
2.

They now use Morse-Formsprag Clutches. The positive action of Morse-Formsprag Clutches is far superior in performance, dependability and service over the old ratchet type. *M-F Clutches engage instantly; allow no back-slip; feed grease to every passing wheel.* Other complex operations on your products may call for Morse-Rockford Friction Clutches . . .

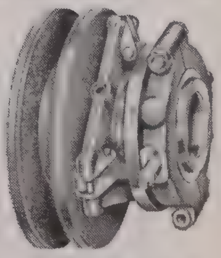


3.

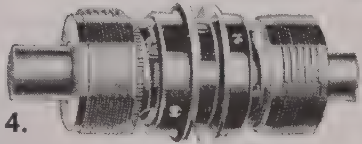
Morse clutches fill almost every need you can imagine. Can the sales and mechanical value of your own products be enhanced by using Morse clutches? Leading manufacturers of such items as construction equipment, cultivators, saws, pumps, lawn mowers and machine tools have bettered *their* products with Morse clutches. How about you? Do this now . . .



Morse-Formsprag Full Complement Over-Running Clutches



Morse-Rockford Over-Center Small Diameter Clutches



Morse Pullmore Friction Clutches

4.

Write for expert clutch engineering aid and consultation. For new ideas, send for clutch catalogs: Morse Formsprag Clutch Catalog, No. C11-48; Morse Pullmore Clutch Catalog, C31-47; Morse-Rockford Clutch Catalog, SDOC. Address: Morse Chain Company, Department 254, 7601 Central Avenue, Detroit 8, Michigan.

Morflex Couplings

Roller Chain Couplings

Silent Chain Drives

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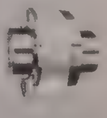


Morflex Radial Couplings

MORSE CHAIN COMPANY • DETROIT 8, MICHIGAN

New England's Hope for Integrated Steel Plant Dimmed Again

Private Research Organization Deals Latest Rebuff To Hope of 30 Years

Boston

• • • New England's 30-year-old hope of seeing an integrated steel plant operating somewhere on its rockbound coast has been set back again.

One by one, the nation's largest steel producers have toyed with the idea of building a sizable integrated mill somewhere along the coast of Massachusetts, Rhode Island, or Connecticut. And, one by one, these firms have turned thumbs down on the idea.

The reasons have always been the same: insufficient regional market, foreign competition, and variations on these two themes. The risks always seemed too great.

Soon after the end of the war, the New England Council—speaking for steel customers, trade associations, and other business groups—asked the Econometric Institute, Inc., to study the New England steel picture and come up with recommendations as to the need for an integrated mill.

But the answer is still "no," as far as the Econometric Institute is concerned. However, the Institute's confidential answer, which now has been delivered to the New England Council, is tempered somewhat with the kindly suggestion that the Council turn its efforts instead toward expansion and improvement of existing plant and equipment.

"Our findings do not show that an integrated steel plant can properly be built at this moment on the New England coast," the Institute declares in its report. But it adds that "there is much reason for considerable expansion of steel capacity and production in the area."

The Institute bluntly declares that the setting up of an integrated mill in New England could be justified "only if raw material supply could be assured at particularly favorable assembly costs."

And, unless this should be the case, and unless the envisaged mill could compete outside the region, its capacity would have to be kept down to a volume of less than a million tons, making difficult economic operations and desirable diversification of production, and jeopardizing its independence, the Institute's engineers believe.

As far as the application of multiple basing points is concerned, the Institute points out that the prospects for an integrated mill in New England would be improved if the basing point system were maintained. But a greater dispersion of finishing operations might take place if basing point pricing were abolished, it is claimed.

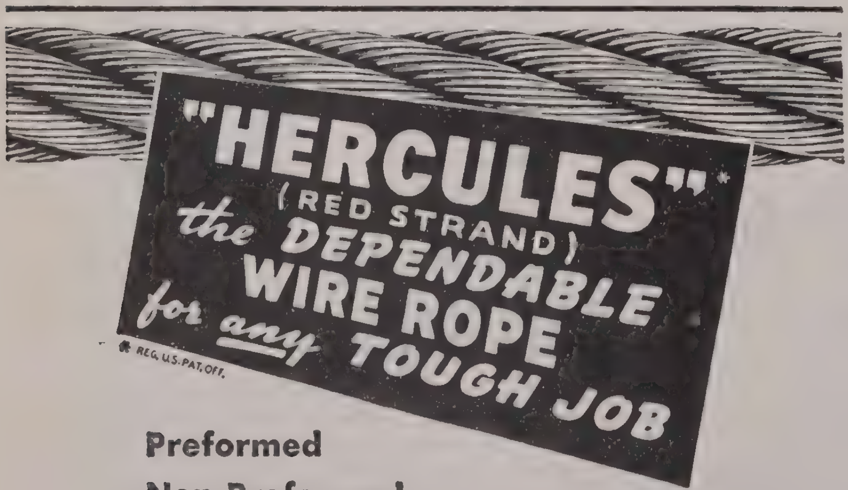
The Institute presents seven conclusions in support of its contention that such a mill would not be feasible:

(1) The assembly of materials for pig iron production in New England is now more costly than at competitive locations and is likely to continue so for several years to come.

(2) New England steel demand is highly diversified, with only rod and wire products offering a sufficient market to approach the output volume of a modern integrated mill. A large part of this rod wire market is already supplied by New England rod and wire production.

(3) Existing New England steel producers have relied for their competitive cost position largely on relatively heavy use of low-cost scrap. An integrated mill, by increasing the regional demand for scrap, threatens to raise New England scrap prices and prejudices

(CONTINUED ON PAGE 177)



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KAYDON Bearings are helping to "make dreams come true" for designers of modern machinery now making the most of the technological advances of the past several years. Heavy-duty machines capable of greater speed, heavier loads, greater precision in performance, longer life . . . machines capable of greater production at lower costs . . . are being engineered with **KAYDON** bearings.

The **KAYDON** line is so complete, with such a broad line of types and sizes of ball and roller bearings . . . from 4″ bore to the unusually large 120″ outside diameter bearings . . . that many former handicaps to design are now removed. **KAYDON** Bearings have become known as the line that helps designers say: "It CAN be done!"

KAYDON also offers manufacturers of precision parts the following modern facilities and services: Atmospheric controlled heat treating, precision heat treating, salt-bath and sub-zero conditioning and treatment, microscopy, physical testing and metallurgical laboratory services. • Counsel in confidence with **KAYDON**. Engineers who are specialists in modern bearings will gladly cooperate with your organization.

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THE KAYDON ENGINEERING CORP.

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MACHINE TOOLS

. . . News and Market Activities

Business is Static; ECA Allocations Begin to Dribble In

• • • **No immediate** change in the machine tool sales outlook was in prospect this week, as allocations from ECA began to dribble in, but in rather unsatisfactory volume.

Reports from major sales sectors indicated that December is shaping up as an "average" month, although some segments of the trade anticipate business at lower levels during the latter part of the month due to the holidays.

Used machinery competition is currently very effective in the Southeast and Southwest, as dealers still have quite a number of war surplus machines in stock. Many of these machines were bought at fixed prices, frequently as a speculative investment, and a number of dealers are doing very well with them, as the prices would seem to indicate. Some machines are bringing 60 pct of the price of a new machine, according to reports, and other machines are selling today for as much as they sold for new during the war.

In Detroit, the trend in the machine tool industry continues to sag. However, there are enough bright spots in an otherwise dark picture to generate moderate enthusiasm in some quarters.

Builders of highly specialized machine tools are operating far below capacity and the absence of any large programs in the entire automobile industry continues as a source of concern. The tool and die industry, while operating at substantially lower levels than a month ago, still has a sizable volume of die work from Chrysler and 1950 General Motors Corp. models. Some of these jobs obviously will be transferred to local tool and die shops in the near future.

Orders for perishable tools have fallen off noticeably in recent months and there are no positive indications of an upturn, according to informed sources.

Highly Specialized Machine Tools are Turned Out at Far Below Capacity

° ° °

Several aspects of the machine tool picture, however, offer grounds for optimism according to local informants. With a fourth round of wage increases in sight, it is more than an expectation that several of the tooling programs now on drafting boards may be given the green light. With the materials outlook for the foundry industry improving, it is confidently expected that some of the heretofore disadvantageous operating conditions confronting the users of highly specialized transfer type machine tools may be at least partially alleviated.

Finally, this week Oldsmobile announced it is giving serious consideration to doubling its present engine plant capacity. While it is not anticipated that the present equipment will be doubled, it is predicted that a sizable addition to the present machine tool setup will be necessary to provide the necessary equipment.

In Philadelphia, ordering is in a lull and there is expected to be no break until after the year end. Inquiries are still heavy. Also, the Westinghouse jet engine plant program, on the verge of final Navy approval, has been held up again and is keeping dealers here on tenterhooks but the log jam may be broken by approval at any time.

At the recent management and merchandising conference of machine tool dealers held here, sponsored jointly by Wharton School of Finance and Commerce and Machinery Dealers National Assn. Dr. Evan B. Alderfer, industrial economist of the Federal Reserve Bank, Philadelphia, warned that the current business outlook is beclouded by a mixture of both inflationary and deflationary development.

Dr. Alderfer declared there is increasing evidence of growing uneasiness in the minds of business men, based on a conviction that business activity cannot continue indefinitely at current high levels.

"Despite substantially full employment and a record volume of output of goods and services, some recession in certain lines of production is causing some anxiety. Demand for durable goods generally is still in excess of current rates of production, and prices of numerous metals and metal products are still rising."

He said business spending for inventories and new plant and equipment is beginning to rise. Inventories are at record levels, but business concerns in every stage from manufacturer to wholesaler to retailer are striving to keep their inventories from rising beyond their proper relationships to sales volume.

Capital expenditures, he pointed out, for new plant and equipment are about 15 pct greater than last year.

"Our Philadelphia survey of capital expenditures to be made in 1949 shows that a decline of about 15 pct may be expected. Local utilities are planning to make extensions and improvement at a rate of about 90 pct of this year's outlays. Although the boom in capital expenditures may have passed its peak, our survey does not point toward anything resembling a collapse."

According to Dr. Alderfer, any possible declines in consumer spending are likely to be counterbalanced by prospective increases in government spending.

Plan Clean Up of Waters Surrounding Detroit Area

Washington

• • • **A $6 million** program to clean up industrially-polluted waters in the Detroit area is now under way as a result of recommendations submitted by a joint United States-Canadian commission.

New "Shield-Arc LH-70" Electrode Simplifies Hard-to-Weld Jobs

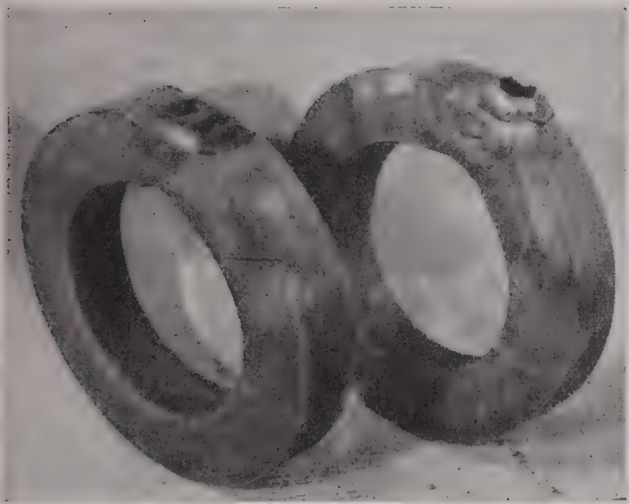


Fig. 1. Left: Ring welded with "Shield-Arc LH-70." Right: Ring with ordinary electrode.

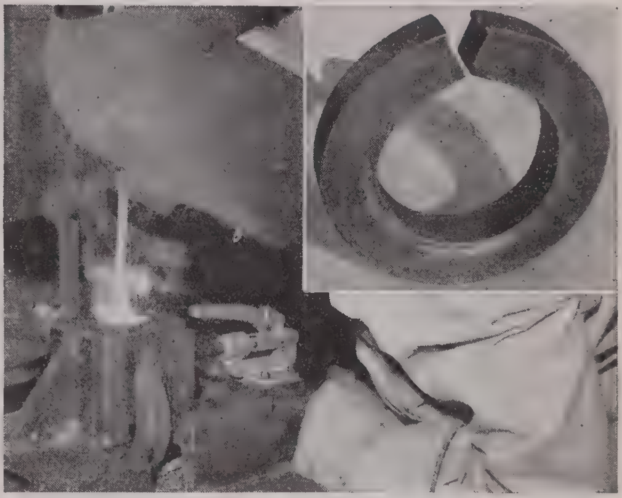


Fig. 2. Butt welding mild steel ring with "Shield-Arc LH-70" using high amperage. Inset shows low carbon steel ring ready for butt welding.

THE high current and greater melt-off rate possible with new "Shield-Arc LH-70" electrode results in 15% to 20% faster welding on many types of low carbon or high sulphur steels.

The one-inch square mild steel ring shown above is butt welded with ¼″ "Shield-Arc LH-70" at 375 amps. With "Shield-Arc LH-70," the welder can stand in and "pour" the electrode into the mold formed by the holding fixture. This is possible because of the unique feature of "Shield-Arc LH-70". . . all slag rises freely to the surface resulting in a dense, uniform weld.

Shown below are other typical hard-to-weld jobs solved with "Shield-Arc LH-70" electrode.

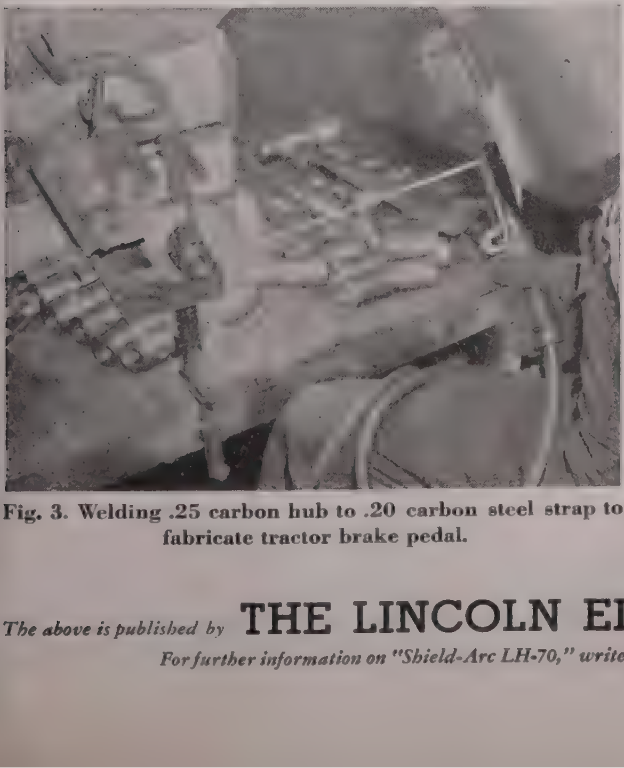


Fig. 3. Welding .25 carbon hub to .20 carbon steel strap to fabricate tractor brake pedal.

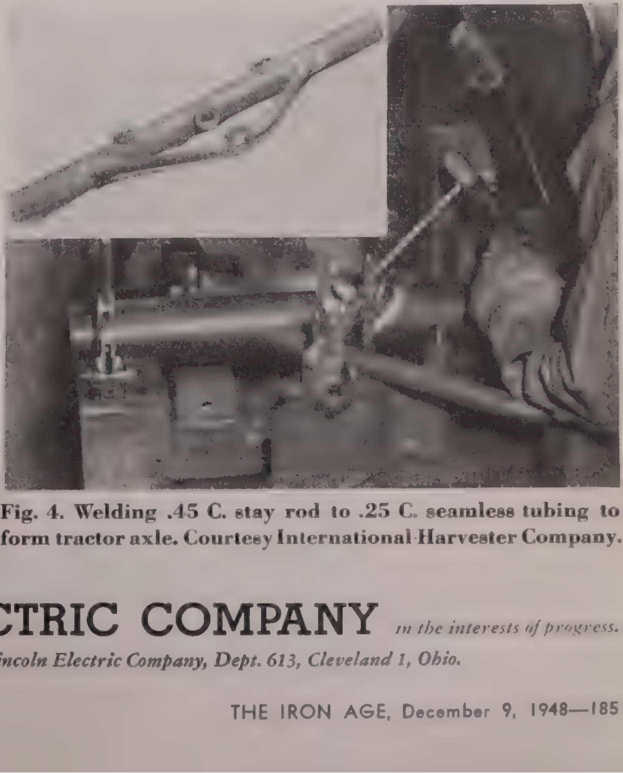


Fig. 4. Welding .45 C. stay rod to .25 C. seamless tubing to form tractor axle. Courtesy International Harvester Company.

The above is published by **THE LINCOLN ELECTRIC COMPANY** *in the interests of progress.*

For further information on "Shield-Arc LH-70," write The Lincoln Electric Company, Dept. 613, Cleveland 1, Ohio.

NONFERROUS METALS

. . . News and Market Activities

Industry Encouraged By Some Easing of Copper, Lead Prices

Fabricators Being Forced To Close Plants Cited As Reason for Trend

New York

• • • **Producers and consumers** are very much encouraged over some easing last week in the frantic efforts of consumers of copper and lead to buy metal at any price. From a gray market high for copper of 28¢ for small lots, the market has dropped to a point that an offering of imported metal believed to have come from Mexico at 26.50¢ has not been bought. However, the Kennecott strike is now in its seventh week and there was no prospect of change in the situation. This strike cuts off nearly one-third of all domestic production and has already cost over 40,000 tons.

Fabricators have been forced into the position of closing down plants due to the lack of metal, which accounts for the greater easiness in the copper gray market and in scrap. Imports of copper from Canada have not been as large this year as expected due to the shortage of power there and the fact that one refinery has had a furnace out for some time. So far no producer of copper has taken the initiative to advance the price beyond 23.50¢. All factors are conscious of the possibility of controls and are making no move to bring them about any sooner than necessary. In the meantime, the stockpiling program accounts for about 10,000 tons a month.

The lead market is still very tight, as the market is still suffering from the effects of the St. Joseph strike and the stoppage of imports during the longshoremen's strikes. However, the gray market is a little easier as consumers are no longer willing to buy metal at any price. The export price is quoted now at 22¢ Gulf Ports. Lead is being bought for the stockpile at the rate of about 7500 tons a month.

The zinc market is still very tight and market factors expect it to grow worse rapidly. The transfer of the Metals Reserve stockpile to the strategic stockpile has made it impossible for consumers to turn to the Dept. of Commerce for metal as a last resort. Meanwhile, the strike at the two plants of American Zinc still goes on without any prospect for settlement. The gray market in zinc never reached the proportions of those in copper and lead largely because of the availability of the government stocks. With these cut off, market factors believe that the buying competition among brass mills, galvanizers and die casters may soon result in an active gray market. Stockpiling of zinc goes on at the rate of about 6000 tons a month.

For the first time in many months, prices of scrap metals are unchanged. Up to the end of last week refineries were willing to pay the top price of 22¢ for No. 1 copper. Since then there has been some hesitancy in the market and new prices are expected to be established at lower levels. The development is due largely to the drop in pressure for scrap for conversion melting. At the same time there was a growing lack of interest in lead scrap and dealers expect that lower prices will be offered by smelters during the week.

Nonferrous Metals Prices

	Dec. 1	Dec. 2	Dec. 3	Dec. 4	Dec. 6	Dec. 7
Copper, electro, Conn.	23.50	23.50	23.50	23.50	23.50	23.50
Copper, Lake, Conn.	23.625	23.625	23.625	23.625	23.625	23.625
Tin, Straits, New York	$1.03	$1.03	$1.03	$1.03	$1.03	$1.03
Zinc, East St. Louis	17.50	17.50	17.50	17.50	17.50	17.50
Lead, St. Louis	21.30	21.30	21.30	21.50	21.30	21.30

•

Builds Foil Rolling Mill

New York

• • • **An aluminum foil** rolling plant is now being built in Jackson, Tenn., by a firm identified as Aluminum Foils, Inc., a subsidiary of Swiss Aluminum of Lausanne. The plant is designed for a capacity of 250 tons of foil a month. It is expected to be ready for operation in about 15 months. Ground has been broken and equipment has been ordered. The president of the company is W. S. Hamnett, 39 Broadway, New York.

Talk Pay Incentive Plans for Contract Tool and Die Shops

Milwaukee

• • • **Pay incentive plans** for contract tool and die shops were thoroughly considered at the third national membership convention of the National Tool & Die Manufacturers Assn., held here recently.

The discussion was opened with a paper presented by S. A. Peck, executive vice president, The Trundle Engineering Co., consulting management engineers, who reported on studies made in a contract tool and die shop and outlined recommendations for establishing incentive plans in such shops. As regards the outlook for more business for the contract shops, Mr. Peck said:

"Our company has always advised our clients to have their tool and die work done outside. We have done this because it is invariably more economical to do so."

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, 10,000 lb, freight allowed	17.00
Aluminum pig	16.00
Antimony, American, Laredo, Tex.	38.50
Beryllium copper, 3.75-4.25% Be dollars per lb contained Be	$24.50
Beryllium aluminum 5% Be, dollars per lb contained Be	$52.00
Cadmium, del'd	$2.00
Cobalt, 97-99% (per lb)	$1.65 to $1.72
Copper electro, Conn. Valley	23.50
Copper, lake, Conn. Valley	23.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$110 to $115
Lead, St. Louis	21.30
Lead, New York	21.50
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots	34.50
Mercury, dollars per 76-lb flask, f.o.b. New York	$79 to $81
Nickel, electro, f.o.b. New York	42.90
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$93 to $96
Silver, New York, cents per oz.	70.00
Tin, Grade A, New York	$1.03
Zinc, East St. Louis	17.50
Zinc, New York	18.15
Zirconium copper, 10-12 pct Zr, per lb contained Zr	$12.00

Remelted Metals

Brass Ingot

(Published prices, cents per lb delivered, carloads)

85-5-5-5 ingot		
No. 115	21.50*	22.00
No. 120	21.00*	21.50
No. 123	20.50*	21.00
80-10-10 ingot		
No. 305	....	27.25
No. 315	..	24.25
88-10-2 ingot		
No. 210	..	33.00
No. 215	..	31.00
No. 245	25.75*	25.75
Yellow ingot		
No. 405	17.50*	17.50
Manganese bronze		
No. 421	....	23.00

* F.o.b. Philadelphia.

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys	
0.30 copper, max.	31.25–31.75
0.60 copper, max.	30.75–31.25
Piston alloys (No. 122 type)	26.50–27.00
No. 12 alum. (No. 2 grade)	26.25–26.75
108 alloy	26.50–27.00
195 alloy	27.00–27.25
13 alloy	31.00–31.50
AXS-679	27.25–27.75

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95 pct-95½ pct	28.75–29.50
Grade 2—92 pct-95 pct	27.75–28.50
Grade 3—90 pct-92 pct	26.75–27.50
Grade 4—85 pct-90 pct	26.25–26.75

Electroplating Supplies

Anodes

(Cents per lb, freight allowed, in 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	40⅛
Electrodeposited	34⅝
Rolled, oval, straight, delivered	37.34
Ball anodes	38⅝
Brass, 80-20	
Cast, oval, 15 in. or longer	35⅞
Zinc, oval, 99.99	
Ball anodes	
Nickel 99 pct plus	
Cast	59.00
Rolled, depolarized	
Cadmium	$2.10
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	79

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	46.00
Copper sulfate, 99.5 crystals, bbls.	9.10
Nickel salts, single or double, 100 lb bags, frt. allowed	18.50
Nickel chloride, 300 lb bbl.	24.50
Silver cyanide, 100 oz. lots, per oz.	59
Sodium cyanide, 96 pct domestic 100 lb drums	16.00
Zinc sulfate, crystals, 22.5 pct, bags	
Zinc sulfate, 25 pct, granules, bbls. frt. allowed	

Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 26.9¢; 4S, 61S-O, 28.8¢; 52S, 30.9¢; 24S-O, 24S-OAL, 29.8¢; 75S-O, 75S-OAL, 36.3¢; 0.081 in., 2S, 3S, 27.9¢; 4S, 61S-O, 30.2¢; 52S, 32.3¢; 24S-O, 24S-OAL, 30.9¢; 75S-O, 75S-OAL, 38¢; 0.032 in., 2S, 3S, 29.5¢; 4S, 61S-O, 33.5¢; 52S, 36.2¢; 24S-O, 24S-OAL, 37.9¢; 75S-O, 75S-OAL, 47.6¢.

Plate: ¼ in. and heavier: 2S, 3S, F, 23.8¢; 4S-F, 26¢; 52S-F, 27.1¢; 61S-O, 26.6¢; 24S-F, 24S-FAL, 27.1¢; 75S-F, 75S-FAL, 33.9¢.

Extruded Solid Shapes: Shape factors 1 to 4; 35.1¢ to 66¢; 11 to 13, 36.1¢ to 78¢; 23 to 25, 38.2¢ to $1.07; 35 to 37, 45.7¢ to $1.65; 47 to 49, 67.5¢ to $2.41.

Rod, Rolled: 1.064 to 4.5 in., 2S-F, 3S-F, 34¢ to 30.5¢; Cold-finished, 0.375 to 3.5 in., 2S, 3S, 36.5¢ to 32¢.

Screw Machine Stock: Drawn, ⅛ to 11/32 in., 11S-T3, R317-T4, 49¢ to 38¢; cold-finished, ⅜ to 1½ in., 11S-T3, 37.5¢ to 35.5¢; ⅜ to 2 in., R317-T4, 37.5¢ to 34.5¢; rolled, 1 9/16 to 3 in., 11S-T3, 35.5¢ to 32.5¢; 2⅛ to 3⅜ in., R317-T4, 33.5¢ to 32.5¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in.: 2S, 36¢ to 26.5¢; 52S, 44¢ to 32¢; 56S, 47¢ to 38.5¢; 17S-T4, 50¢ to 34.5¢; 61S-T4, 44.5¢ to 34¢; 75S-T6, 76¢ to 55¢.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed Base quantity 30,000 lb)

Sheet and Plate: Ma, FSa, ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-$1.01; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher.

Extruded Round Rod: M, diam. in., ¼ to 0.311, 58¢; ½ to ¾, 46¢; 1¼ to 1.749, 43¢; 2½ to 5, 41¢. Other alloys higher.

Extruded Square, Hex. Bar: M, size across flats, in., ¼ to 0.311, 61¢; ½ to 0.749, 48¢; 1¼ to 1.749, 44¢; 2½ to 4, 42¢. Other alloys higher.

Extruded Solid Shapes, Rectangles: M, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb. per ft. per. up to 3.5 in., 55¢; 0.22 to 0.25 lb per ft, per. up to 5.9 in., 51¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 47¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 44¢; 4 to 6 lb per ft, per. up to 28 in., 43¢. Other alloys higher.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, $1.14; 5/16 to ⅜, $1.02; ½ to ⅝, 76¢; 1 to 2 in., 65¢. 0.065 to 0.082, ⅜ to 7/16, 85¢; ⅝ to ¾, 62¢; 1 to 2 in., 57¢. 0.165 to 0.219, ⅝ to ¾, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	60	47
Strip, cold-rolled	66	50
Rods and shapes		
Hot-rolled	56	45
Cold-drawn	56	45
Angles, hot-rolled	56	45
Plates	58	46
Seamless tubes	89	80
Shot and blocks	..	40

Copper, Brass, Bronze

(Cents per pound, freight prepaid on 200 lb)

	Extruded Shapes	Rods	Sheets
Copper	36.78	....	37.18
Copper, hot-rolled	....	33.03	....
Copper, drawn	....	34.28	..
Low brass	38.57*	35.35	35.66
Yellow brass	37.60*	34.28	34.59
Red brass	38.92*	35.70	36.01
Naval brass	34.90	33.65	39.59
Leaded brass	....	29.24	....
Commercial bronze	39.54*	36.57	36.88
Manganese bronze	38.49	36.99	43.09
Phosphor bronze, 5 pct	57.80*	56.30	56.05
Muntz metal	34.47	33.22	37.66
Everdur, Herculoy, Olympic, etc.	40.49	40.76	41.82
Nickel silver 10 pct	....	47.17	44.77
Architectural bronze	33.42	....	....

* Seamless tubing.

Scrap Metals

Brass Mill Scrap

(Cents per pound; add ½¢ per lb for shipments of 20,000 lb or more)

	Heavy	Turnings
Copper	21⅛	20⅝
Yellow brass	18⅞	18⅛
Red brass	20	19¼
Commercial bronze	20⅛	19⅜
Manganese bronze	18¾	17⅞
Leaded brass rod ends	18⅛	

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery.)

No. 1 copper wire	21.75–22.00
No. 2 copper wire	20.75–21.00
Light copper	19.75–20.00
Refinery brass	19.00–19.25

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer.)

No. 1 copper, wire	19.75
No. 2 copper, wire	18.75
Light copper	17.75
No. 1 composition	16.75–17.00
No. 1 comp. turnings	16.50–16.75
Rolled brass	13.00–13.50
Brass pipe	13.25–13.75
Radiators	14.00
Heavy yellow brass	12.50–12.75

Aluminum

Mixed old cast	16.50
Mixed old clips	16.75
Mixed turnings, dry	14.50
Pots and pans	16.75
Low copper	19.00

Dealers' Scrap

(Dealer's buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	19½—20
No. 2 heavy copper and wire	18½—19
Light copper	17½—18
Auto radiators (unsweated)	12¾—13
No. 1 composition	15—15½
No. 1 composition turnings	14½—15
Clean red car boxes	12½—13
Cocks and faucets	12½—13
Mixed heavy yellow brass	9½—10
Old rolled brass	12—12½
Brass pipe	13—13½
New soft brass clippings	15—15½
Brass rod ends	13—13½
No. 1 brass rod turnings	12½—13

Aluminum

Alum. pistons and struts	8½—9
Aluminum crankcases	12½—13
2S aluminum clippings	16½—17
Old sheet & utensils	12½—13
Borings and turnings	6—6½
Misc. cast aluminum	12½—13
Rural clips (24S)	12½—13

Zinc

New zinc clippings	11½—12
Old zinc	10—10½
Zinc routings	5¾—6¼
Old die cast scrap	6¾—7¼

Nickel and Monel

Pure nickel clippings	22—23
Clean nickel turnings	17—18
Nickel anodes	22—23
Nickel rod ends	21—22
New Monel clippings	15½—16½
Clean Monel turnings	11—12
Old sheet Monel	13—14
Old Monel castings	10—11
Inconel clippings	12—13
Nickel silver clippings, mixed	8—8½
Nickel silver turnings, mixed	7—7½

Lead

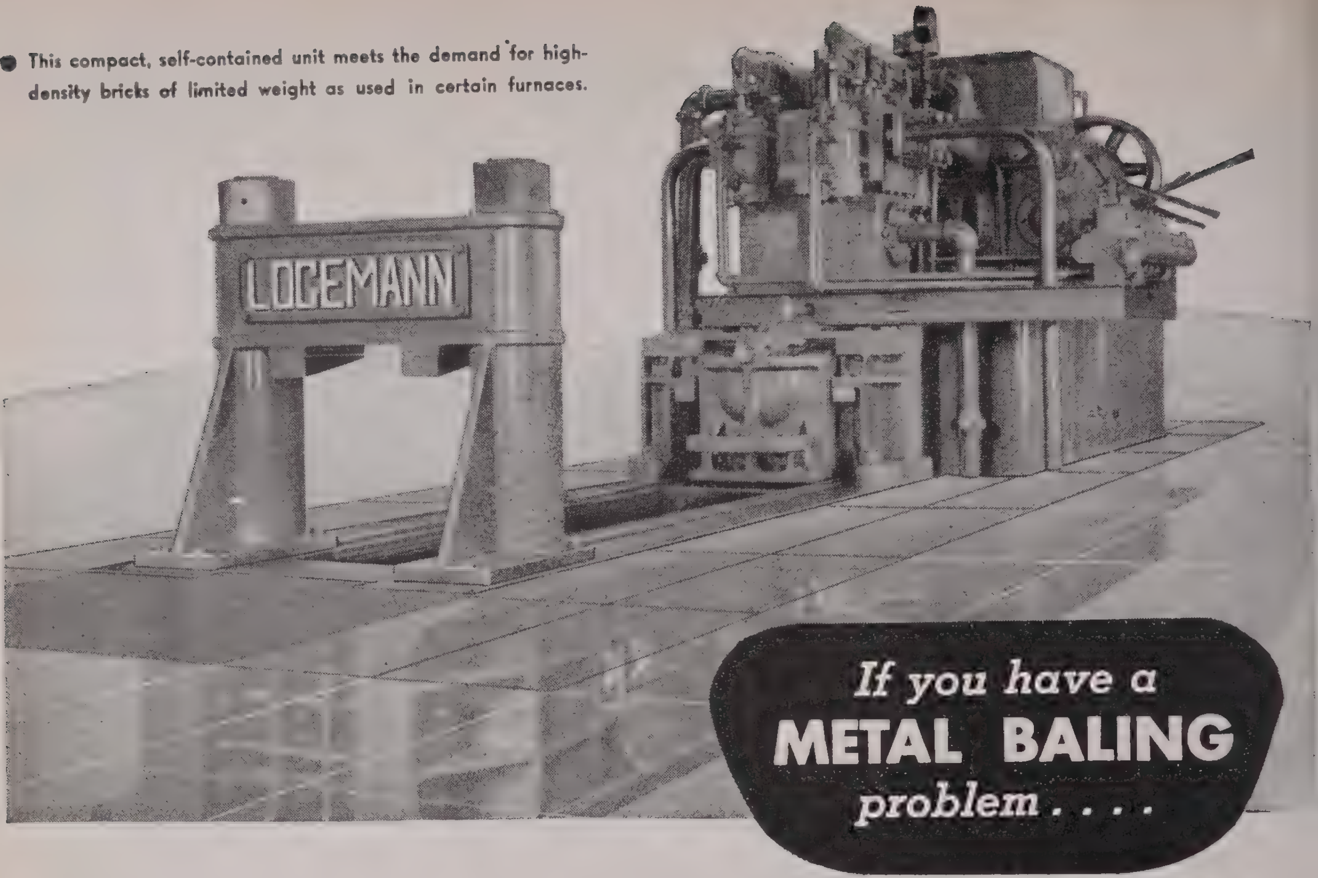
Soft scrap lead	20—20½
Battery plates (dry)	13—13½

Magnesium Alloys

Segregated solids	8—9
Castings	4½—5½

Miscellaneous

Block tin	82—84
No. 1 pewter	65—67
No. 1 auto babbitt	51—53
Mixed common babbitt	20—20½
Solder joints	22½—23½
Siphon tops	50—52
Small foundry type	21½—22
Monotype	20½—21
Lino. and stereotype	20—20½
Electrotype	18½—19
New type shell cuttings	16½—17
Hand picked type shells	7½—8
Lino. and stereo dross	11½—12
Electro dross	8—8½



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SCRAP

. . . News and Market Activities

Cast Market Varies in Different Areas

New York

• • • The **heavy melting** market continued along its normal way this week. But the cast market started to do flip-flops.

Heavy breakable cast jumped a buck in Pittsburgh to go at $62 to $63. Demand is not particularly strong there, but outside pressure forced the change.

In Chicago, however, No. 1 machinery cast dropped 50¢ to sell at $70 to $72. The railroad specialties in this district went in the opposite direction. Rerolling rails were up 50¢, and standard steel car axles jumped $2 to hit the market at $85 to $87.

In Detroit job foundry demand for cast scrap has slipped noticeably, while it has also weakened considerably in Philadelphia in the openhearth and pipe foundry grades. The same situation in Buffalo exists and although there were no price changes demand has fallen off considerably.

Because of area conditions cast grade prices remain high in Birmingham and supply is still far behind demand. Higher prices have not been the solution to eliminating the shortage.

Rumors of decline in the foundry business are set forth as a partial reason for the weakness in the cast grade market in some areas. Reliable sources on the other hand indicate that large buyers are still taking shipments but that they are better fixed than they have been for over a year and that they would like to see what the New Year was going to bring.

Demand for the low phos grade in Pittsburgh is very strong. It is now quoted at $49.50 to $50.50, up $1 for the week. Low phos is expected to continue in strong demand there as more electric furnace melting is brought in.

Although many of the mills were bragging about large inventories for winter stockpiles a month ago, those stockpiles are not quite as large today as they were then. The mills are still better off than they had anticipated they would be by December, but the high level of operations has kept the demand up in the heavy melting grades. There are still rumors of some buying at over-the-market prices. If operations continue at this level—and there is reason to expect that they will—these prices should hold for a while.

•

PITTSBURGH—Openhearth scrap users continue to operate at high levels here but their stocks are still in good shape. They have had a good break in the weather to date and few appear concerned about their winter inventory position. Dealer shipments were off only slightly in the past week. Steel foundries continue to shy away from railroad specialties at going prices, claiming they have ample stocks on the ground. Cast iron demand is not particularly strong here but outside pressure has forced heavy breakable cast up $1 to a quotation of $62 to $63. Low phosphorus grades, which are expected to continue in strong demand as more electric furnace melting is brought in here, was higher during the past week. It is now quoted at $49.50 to $50.50, up $1 for the week.

•

CHICAGO — The market continues to drift along last week. No major price changes took place. A few railroad specialties edged higher on the lists that closed. Mills are not interested in dealer scrap. It appears the move to squeeze down dealer prices will be made at any moment. Bundles will soon show a differential under heavy melting, observers here declare.

•

PHILADELPHIA—The scrap market is relatively unchanged from last week. Mills are very comfortably fixed with inventories and are not pressing for delivery. Intake into yards is rather slow but dealers are still able to take orders freely. The short shoveling price has reached a top of $40. Cast is weaker in openhearth and pipe foundry grades.

•

CLEVELAND — Talk of lower scrap prices this spring is in the air, but the market isn't affected. Buyers are inclined to dismiss the recent prices paid for railroad specialties as an indicator of market strength, but the fact remains that certain grades of scrap are virtually unobtainable at market prices. Openhearth shipments are fair, but quality is mediocre. The better material is going out of the district through up-grading, or the simpler expedient of higher than market prices. Electric furnace material is out of the range of major consumers here, who stick to market prices. Blast furnace is weak. In general the market here and in the Valley is confused. Consumers with heavy inventories are inclined to back off a little bit. Others, who because of the prices have smaller inventories, are in a real quandary.

DETROIT—The trend of the scrap market in this area is downward although activity in certain grades plus market price support has restricted local price movements. Electric furnace grades are still strong but turnings and blast furnace scrap are easier, with one mill here buying a substantial tonnage, it is reported, for $30 delivered. Job foundries are off sharply in Detroit. With operations reduced to 2 to 3 days each week, foundry demand for cast grades has slipped noticeably. Ford buying has given considerable support to the local cast market, it is indicated.

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CINCINNATI — Openhearth consumers are having difficulties getting their requirements at market prices, although foundry grades are easier. Inventory-wise some major consumers are losing ground when they, by their own admission, should be building up. Quality is only fair, and some of the better material in this area is moving to other districts, at more money. Electric furnace grades are practically unobtainable at market prices for this reason.

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NEW YORK—The market is moving along at its normal tempo. Prices are firm at current levels and shipments continue fair. The cast grade market is a little mixed. Foundries are better off as far as supply is concerned than they were 3 or 4 months and even a year ago. Some report that their business is falling off while others are wondering what the first of the year will bring. But there is sufficient movement at current prices to adopt the wait-and-see attitude. Clean cast chemical borings are still out of the picture with no movement, no demand and quoted prices remaining nominal.

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BIRMINGHAM—Demand remains steady at high level for cast scrap here, with supply continuing to lag behind demand. Steel scrap inventories are good, however, with demand somewhat slower. Prices for all grades of scrap remain unchanged.

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BOSTON—Little change has taken place in the market status here. Business is only fair and spotty. Some say this situation will exist until the first of the year.

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BUFFALO — Foundry operations were such as to weaken the undertone of foundry specialties. There were no price changes but demand has fallen off considerably. New York Central railroad specialty price lists closed firm. Demand, also for blast furnace scrap is strong, as it is for openhearth grades. Last week a 2000 ton boat load of blast furnace scrap was received from Detroit.

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ST. LOUIS—Railroad offerings of scrap iron are bringing higher prices than market quotations because of conversion deals and speculative buying by some dealers. The movement of scrap to the St. Louis industrial district is fair for this time of year. Steel mills have a supply sufficient for requirements for the next 45 to 60 days, and tightening on inspections.

IRON AND STEEL SCRAP PRICES

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$42.50 to	$43.00
RR. hvy. melting	43.50 to	44.00
No. 2 hvy. melting	42.50 to	43.00
RR. scrap rails	58.00 to	59.00
Rails 2 ft and under	62.00 to	62.50
No. 1 comp'd bundles	42.50 to	43.00
Hand bdld. new shts.	42.50 to	43.00
Hvy. axle turn.	45.50 to	46.50
Hvy. steel forge turn.	45.50 to	46.50
Mach. shop turn.	37.50 to	38.00
Shoveling turn.	39.00 to	40.00
Mixed bor. and turn.	37.50 to	38.00
Cast iron borings	39.50 to	40.00
No. 1 mach. cast	69.50 to	70.50
Mixed yard cast	65.00 to	66.00
Hvy. breakable cast	62.00 to	63.00
Malleable	76.00 to	77.00
RR. knuck. and cup.	57.00 to	58.00
RR. coil springs	58.50 to	59.50
RR. leaf springs	58.50 to	59.50
Rolled steel wheels	57.00 to	58.00
Low phos.	49.50 to	50.50

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$41.50 to	$42.00
No. 2 hvy. melting	41.50 to	42.00
No. 1 bundles	41.50 to	42.00
No. 2 dealers' bundles	41.50 to	42.00
Bundled mach. shop turn.	41.50 to	42.00
Galv. bundles	39.50 to	40.00
Mach. shop turn.	36.50 to	37.00
Short shov. turn.	38.50 to	39.00
Cast iron borings	37.50 to	38.00
Mix. borings and turn.	36.50 to	37.00
Low phos. hvy. forge	51.00 to	52.00
Low phos. plates	49.00 to	50.00
No. 1 RR. hvy. melt.	44.25 to	50.00
Rerolling rails	73.00 to	74.00
Miscellaneous rails	65.00 to	66.00
Angles & splice bars	58.00 to	59.00
Locomotive tires, cut	59.00 to	60.00
Cut bolster & side frames	52.00 to	55.00
Standard stl. car axles	85.00 to	87.00
No. 3 steel wheels	53.00 to	54.00
Couplers and knuckles	54.00 to	55.00
Rails, 2 ft and under	62.50 to	65.00
Malleable	83.00 to	84.00
No. 1 mach. cast.	70.00 to	72.00
No. 1 agricul. cast.	63.00 to	64.00
Heavy breakable cast.	62.00 to	64.00
RR. grate bars	60.00 to	64.00
Cast iron brake shoes	60.00 to	61.00
Cast iron car wheels	65.00 to	66.00

CINCINNATI

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	$40.00 to	$41.00
No. 2 hvy. melting	40.00 to	41.00
No. 1 bundles	40.00 to	41.00
No. 2 bundles	40.00 to	41.00
Mach. shop turn.	35.00 to	36.00
Shoveling turn.	37.00 to	38.00
Cast iron borings	36.00 to	37.00
Mixed bor. & turn.	35.00 to	36.00
Low phos., 18 in. under	48.00 to	49.00
No. 1 cupola cast.	65.00 to	66.00
Hvy breakable cast	59.00 to	60.00
Rails 18 in. and under	61.00 to	63.00
Rails random length	56.00 to	57.00
Drop broken	69.00 to	70.00

BOSTON

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$34.40 to	$38.50
No. 2 hvy. melting	....	34.40
Nos. 1 and 2 bundles	....	34.40
Bushelings	....	34.40
Shoveling turn.	....	31.40
Machine shop turn.	29.40 to	31.00
Mixed bor. and turn.	29.40 to	31.00
Cl'n cast chem. bor.	37.50 to	38.50
No. 1 machinery cast.	64.00 to	65.00
No. 2 machinery cast.	57.00 to	59.00
Heavy breakable cast.	53.50 to	54.50
Stove plate	56.00 to	57.00

DETROIT

Per gross ton, brokers' buying prices f.o.b. cars:

No. 1 hvy. melting	....	$38.00
No. 2 hvy. melting	....	38.00
No. 1 bundles	....	38.00
New busheling	....	38.00
Flashings	....	38.00
Mach. shop turn.	$32.50 to	33.00
Machinery cast	63.00 to	65.00
Mixed yard cast	57.00 to	58.00
Shoveling turn.	32.50 to	33.00
Cast iron borings	32.50 to	33.00
Mixed bor. & turn.	32.50 to	33.00
Low phos. plate	42.50 to	43.00
Heavy breakable cast.	53.00 to	57.00
Stove plate	57.00 to	58.00
Automotive cast.	64.00 to	66.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$44.00 to	$45.00
No. 2 hvy. melting	41.00 to	41.50
No. 1 bundles	44.00 to	45.00
No. 2 bundles	41.00 to	41.50
Mach. shop turn.	37.00 to	38.00
Shoveling turn.	39.00 to	40.00
Mixed bor. and turn.	36.75 to	37.25
Clean cast chemical bor.	42.00 to	43.00
No. 1 machinery cast.	66.00 to	67.00
No. 1 mixed yard cast.	61.00 to	62.00
Hvy. breakable cast	62.00 to	63.00
Clean auto cast.	65.00 to	66.00
Hvy. axle forge turn.	46.00 to	47.00
Low phos. acid, openhearth	49.00 to	50.00
Low phos., electric furnace	51.00 to	52.00
Low phos. bundles	47.00 to	48.00
RR. steel wheels	54.00 to	55.00
RR. coil springs	54.00 to	55.00
RR. malleable	80.00 to	82.00
Cast iron carwheels	68.00 to	70.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	$44.00 to	$45.00
No. 2 hvy. melting	40.00 to	41.00
Bundled sheets	40.00 to	41.00
Mach. shop turn.	35.00 to	36.00
Shoveling turnings	37.00 to	38.00
Locomotive tires, uncut	47.00 to	48.00
Mis. std. sec. rails	57.00 to	58.00
Steel angle bars	55.00 to	57.00
Rails 3 ft and under	60.00 to	62.00
RR. steel springs	50.00 to	51.00
Steel car axles	73.00 to	75.00
Brake shoes	57.00 to	58.00
Malleable	77.00 to	78.00
Cast iron car wheels	65.00 to	66.00
No. 1 machinery cast.	66.00 to	67.00
Hvy. breakable cast.	60.00 to	61.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	....	$40.00
No. 2 hvy. melting	.. .	40.00
No. 2 bundles	.. .	40.00
No. 1 bunsheling	.. .	40.00
Long turnings	$32.00 to	33.00
Shoveling turnings	35.00 to	36.00
Cast iron borings	....	29.50
Bar crops and plate	44.00 to	45.00
Structural and plate	44.00 to	45.00
No. 1 cupola cast.	71.00 to	73.00
Stove plate	65.00 to	67.00
No. 1 RR. hvy. melt.	....	41.00
Steel axles	51.00 to	52.00
Scrap rails	44.00 to	45.00
Rerolling rails	65.00 to	67.00
Angles & splice bars	53.00 to	54.00
Rails 3 ft & under	53.00 to	54.00
Cast iron carwheels	63.00 to	64.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$42.50 to	$43.00
No. 2 hvy. melting	42.50 to	43.00
Mach. shop turn.	37.50 to	38.00
Short shov. turn.	39.00 to	40.00
Cast iron borings	38.00 to	39.00
Low phos.	47.50 to	48.00

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$38.50 to	$39.00
No. 2 hvy. melting	....	37.00
No. 2 bundles	....	37.00
Mach. shop turn.	31.50 to	32.00
Mixed bor. & turn.	31.50 to	32.00
Shoveling turnings	33.50 to	34.00
Machinery cast.	59.00 to	60.00
Mixed yard cast	57.00 to	58.00
Heavy breakable cast.	56.00 to	57.00
Charging box cast.	56.00 to	57.00
Unstrp. motor blks.	53.50 to	54.50
Cl'n cast chem. bor.	38.00 to	39.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$47.00 to	$49.00
No. 2 hvy. melting	41.75 to	42.25
No. 1 bundles	41.75 to	42.25
No. 2 bundles	41.75 to	42.25
No. 1 busheling	41.75 to	42.25
Mach. shop turn.	36.75 to	37.25
Shoveling turn.	38.75 to	39.25
Cast iron borings	37.75 to	38.25
Mixed bor. and turn.	36.75 to	37.25
Clean auto. cast.	69.00 to	70.00
Mixed cupola cast.	66.00 to	68.00
Stove plate	66.00 to	68.00
RR. malleable	70.00 to	75.00
Small indus. malleable	47.00 to	49.00
Low phos. plate	48.00 to	50.00
Scrap rails	....	58.00
Rails 3 ft & under	63.00 to	64.00
RR. steel wheels	56.00 to	58.00
RR. coil & leaf spgs.	56.00 to	58.00
RR. knuckles & coup.	56.00 to	58.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$42.00 to	$42.50
No. 2 hvy. melting	42.00 to	42.50
No. 1 bundles	42.00 to	42.50
No. 1 busheling	42.00 to	42.50
Drop forge flashings	42.00 to	42.50
Mach. shop turn.	37.00 to	37.50
Shoveling turn.	38.50 to	39.50
Steel axle turn.	42.00 to	42.50
Cast iron borings	37.50 to	38.50
Mixed bor. & turn.	36.50 to	37.50
Low phos. 2 ft and under	47.00 to	47.50
No. 1 machinery cast.	73.00 to	75.00
Malleable	79.00 to	81.00
RR. cast.	76.00 to	78.00
Railroad grate bars	60.00 to	62.00
Stove plate	61.00 to	63.00
RR. hvy. melting	43.00 to	43.50
Rails 3 ft and under	63.50 to	64.50
Rails 18 in. and under	65.00 to	66.00

SAN FRANCISCO

Per gross ton, f.o.b. shipping point:

No. 1 hvy. melting	....	$27.50
No. 2 hvy. melting	....	27.50
No. 2 bales	....	27.50
No. 3 bales	....	24.50
Mach. shop turn.	....	18.00
Elec. fur. 1 ft under	$40.00 to	42.00
No. 1 cupola cast.	58.00 to	60.00
RR. hvy. melting	....	28.50
Rails	......	29.00

LOS ANGELES

Per gross ton, f.o.b. shipping point:

No. 1 hvy. melting	....	$27.50
No. 2 hvy. melting	....	27.50
No. 1 bales	....	27.50
No. 2 bales	....	27.50
No. 3 bales	....	24.50
Mach. shop turn.	....	20.00
Elec. fur. 1 ft under	$40.00 to	42.00
No. 1 cupola cast.	58.00 to	68.00
RR. hvy. melting	....	28.50

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt.	$27.50 to	$30.00
Elec. fur. 1 ft and under	40.00 to	42.00
No. 1 cupola cast.	50.00 to	54.00
RR. hvy. melting	30.00 to	33.00

HAMILTON, ONT.

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point:

Heavy melting		$23.00*
No. 1 bundles		23.00*
No. 2 bundles		22.50*
Mechanical bundles		21.00*
Mixed steel scrap		19.00*
Mixed borings and turnings		17.00*
Rails, remelting		23.00*
Rails, rerolling		26.00*
Bushelings		17.50*
Bushelings, new fact, prop'd		21.00*
Bushelings, new fact, unprop'd		16.00*
Short steel turnings		17.00*
No. 1 cast	$48.00 to	50.00*
No. 2 cast	44.00 to	45.00*

*Ceiling Price

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices . .

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

	Dec. 7, 1948	Nov. 30, 1948	Nov. 9, 1948	Dec. 9, 1947
Flat-Rolled Steel:				
(cents per pound)				
Hot-rolled sheets	3.26	3.26	3.26	2.80
Cold-rolled sheets	4.00	4.00	4.00	3.55
Galvanized sheets (10 ga)	4.40	4.40	4.40	3.95
Hot-rolled strip	3.265	3.265	3.265	2.80
Cold-rolled strip	4.063	4.063	4.063	3.55
Plates	3.42	3.42	3.42	2.95
Plates wrought iron	7.85	7.85	7.85	6.85
Stains C-R strip (No. 302)	33.25	33.25	33.25	30.50
Tin and Terneplate:				
(dollars per base box)				
Tinplate (1.50 lb) cokes	$6.80	$6.80	$6.80	$5.75
Tinplate, electro (0.50 lb)	6.00	6.00	6.00	5.05
Special coated mfg. ternes	5.90	5.90	5.90	4.90
Bars and Shapes:				
(cents per pound)				
Merchant bars	3.37	3.37	3.37	2.90
Cold-finished bars	3.995	3.995	3.995	3.55
Alloy bars	3.75	3.75	3.75	3.30
Structural shapes	3.25	3.25	3.25	2.80
Stainless bars (No. 302)	28.50	28.50	28.50	26.00
Wrought iron bars	9.50	9.50	9.50	7.15
Wire:				
(cents per pound)				
Bright wire	4.256	4.256	4.256	3.55
Rails:				
(dollars per 100 lb)				
Heavy rails	$3.20	$3.20	$3.20	$2.75
Light rails	3.55	3.55	3.55	3.10
Semifinished Steel:				
(dollars per net ton)				
Rerolling billets	$52.00	$52.00	$52.00	$45.00†
Slabs, rerolling	52.00	52.00	52.00	45.00†
Forging billets	61.00	61.00	61.00	55.00†
Alloy blooms, billets, slabs	63.00	63.00	63.00	66.00†
Wire rod and Skelp:				
(cents per pound)				
Wire rods	3.619	3.619	3.619	2.80
Skelp	3.25	3.25	3.25	2.60

† Gross ton

	Dec. 7, 1948	Nov. 30, 1948	Nov. 9, 1948	Dec. 9, 1947
Pig Iron:				
(per gross ton)				
No. 2, foundry, Phila.	$51.56	$51.56	$51.56	$40.97
No. 2, Valley furnace	46.50	46.50	46.50	36.50
No. 2, Southern Cin'ti	49.47	49.47	49.47	40.24
No. 2, Birmingham	43.38	43.38	43.38	34.38
No. 2, foundry, Chicago†	46.00	46.00	46.00	36.00
Basic del'd Philadelphia	50.76	50.76	50.76	40.47
Basic, Valley furnace	46.00	46.00	46.00	36.00
Malleable, Chicago†	46.50	46.50	46.50	36.50
Malleable, Valley	46.50	46.50	46.50	36.50
Charcoal, Chicago	73.78	73.78	73.78	56.04
Ferromanganese‡	161.71	161.71	161.71	145.00

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† The switching charge for delivery to foundries in the Chicago district is $1 per ton.

‡ Average of U. S. prices quoted on Ferroalloy page.

	Dec. 7, 1948	Nov. 30, 1948	Nov. 9, 1948	Dec. 9, 1947
Scrap				
(per gross ton)				
Heavy melt'g steel, P'gh.	$42.75	$42.75	$42.75	$40.00
Heavy melt'g steel, Phila.	44.50	44.50	44.50	42.00
Heavy melt'g steel, Ch'go	41.75	41.75	41.75	38.75
No. 1, hy. comp. sh't, Det.	38.00	38.00	38.00	34.75
Low phos. Young'n	47.75	47.75	47.75	47.25
No. 1, cast, Pittsburgh	70.00	70.00	70.00	53.50
No. 1, cast, Philadelphia	66.50	66.50	66.50	53.50
No. 1, cast, Chicago	*71.00*	72.50	72.50	58.50
Coke, Connellsville:				
(per net ton at oven)				
Furnace coke, prompt	$15.00	$15.00	$15.00	$12.50
Foundry coke, prompt	17.00	17.00	17.00	14.00
Nonferrous Metals:				
(cents per pound to large buyers)				
Copper, electro, Conn.	23.50	23.50	23.50	21.50
Copper, Lake Conn.	23.625	23.625	23.625	21.625
Tin, Grade A, New York.	$1.03	$1.03	$1.03	80.00
Zinc, East St. Louis	17.50	17.50	15.50	10.50
Lead, St. Louis	21.30	21.30	21.30	14.80
Aluminum, virgin	17.00	17.00	17.00	15.00
Nickel, electrolytic	42.90	42.90	42.90	37.67
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	38.50	38.50	38.50	33.00

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942, and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when shipments for this quarter are compiled.

	FINISHED STEEL (Base Price)	PIG IRON	SCRAP STEEL
Dec. 7, 1948	3.75628¢ per lb.	$46.82 per gross ton	$43.00 per gross ton
One week ago	3.75628¢ per lb.	$46.82 per gross ton	$43.00 per gross ton
One month ago	3.75628¢ per lb.	$46.82 per gross ton	$43.00 per gross ton
One year ago	3.19541¢ per lb.	$37.06 per gross ton	$40.25 per gross ton

	HIGH	LOW	HIGH	LOW	HIGH	LOW
1948	3.75700¢ July 27	3.22566¢ Jan. 1	$46.82 Oct. 12	$39.58 Jan. 6	$43.16 July 27	$39.75 Mar. 9
1947	3.19541¢ Oct. 7	2.87118¢ Jan. 7	37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 20
1946	2.83599¢ Dec. 31	2.54490¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.44104¢ Oct. 2	2.54490¢ Jan. 2	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.29176¢	2.29176¢	23.61	23.61	$19.17	$19.17
1942	2.28249¢	2.28249¢	23.61	23.61	19.17	19.17
1941	2.43078¢	2.43078¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. producing points in cents per pound unless otherwise indicated. Extras apply. (1) Commercial quality sheet grade; prices, 0.25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Cokes, 1.25 lb, deduct 20¢ per base box. (6) 18 gage and heavier. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 40,000 lb and over. (9) Carload lot in manufacturing trade. (10) Hollowware enameling, gages 29 to 31 only. (11) Produced to dimensional tolerances in AISI Manual Sec. 6. (12) Slab prices subject to negotiation in most cases. (13) San Francisco only. (14) Los Angeles only. (15) San Francisco and Los Angeles only. (16) Seattle only. (17) Seattle and Los Angeles only.

PRODUCTS	Base prices at producing points apply to the sizes and grades produced in these areas														
	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio		Detroit	Johnstown	Seattle, S. Frisco, LosAngeles	Fontana
INGOTS Carbon forging	$50.00														
Alloy	$51.00						(per net ton)								
BILLETS, BLOOMS, SLABS Carbon, rerolling[12]	$52.00				$52.00	$52.00	(per net ton)						$52.00		
Carbon forging billets	$61.00	$61.00	$61.00	$61.00	$61.00	$61.00	(per net ton)						$61.00		
Alloy	$63.00	$63.00				$63.00	(Bethlehem, Canton, Massillon = $63.00) (per net ton)								
PIPE SKELP	3.25						3.25				Warren =3.25				
WIRE RODS	3.40 to 4.15	3.40 to 3.90		3.40	3.40		3.65	3.50			Worcester 3.70		3.40	4.05[13] 4.10[14]	
SHEETS Hot-rolled[6]	3.25 to 3.30	3.25	3.25	3.25–3.30	3.25	3.25	3.25	3.25		Warren, Ashland =3.25		3.45		3.95[15]	5.65
Cold-rolled[1]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.70	4.00	Warren 4.00	4.20		Pittsburg, Cal. 4.95	
Galvanized (10 gage)	4.40	4.40	4.40		4.40			4.40	Canton =4.40	4.40	Ashland =4.40			5.15[15]	
Enameling (12 gage)	4.40	4.40	4.40	4.40			4.40		4.60	4.40		4.70			
Long ternes[2] (10 gage)	4.80		4.80							4.80					
STRIP Hot-rolled[3]	3.25 to 3.30	3.25 to 3.30	3.25	3.25 to 3.30	3.25	3.25	3.25	3.25		3.25	Warren =3.25	3.45		4.00 to 4.25	5.90
Cold-rolled[4]	4.00	4.25		4.00	4.00	4.00	4.00	4.00		New Haven 4.50 Warren=4.00 to 4.25		4.20 to 4.50			7.10
TINPLATE Cokes, 1.50 lb.[5] base box	$6.80	$6.80	$6.80		$6.90			$6.90	$7.00	Warren, Ohio =$6.80				Pittsburg, Cal.=$7.55	
Electrolytic 0.25, 0.50, 0.75 lb. box	Deduct $1.00, 80¢ and 60¢ respectively from 1.50 lb. coke base box price														
TERNES MFG., special coated	Deduct 90¢ from 1.50 lb. coke base box price														
BLACKPLATE CANMAKING 55-70 lb, 75-95 lb, 100-128 lb	Deduct $1.60, $1.70 and $1.60 respectively from 1.50 lb. coke base box price														
BLACKPLATE, h.e., 29 ga.[10]	4.75	4.75	4.75					4.85							
BARS Carbon Steel	3.35 to 3.55	3.35	3.35	3.35	3.35	3.35	3.35	3.35		3.35	Canton =3.35	3.55	3.35	4.05 to 4.10	5.30
Reinforcing (billet)[7]	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35			Canton =3.35		3.35	4.05 to 4.10	5.30
Cold-finished[8]	3.95 to 4.00	4.00	4.00	4.00		4.00	4.00					4.30			
Alloy, hot-rolled	3.75	3.75	3.75			3.75	3.75	Bethlehem, Canton, Massillon=3.75				4.05	3.75	4.80[14]	5.50
Alloy cold-drawn	4.65 to 4.75	4.65	4.65	4.65		4.65	4.65	Massillon=4.65			Worcester 4.95				
PLATE Carbon steel[11]	3.40 to 3.60	3.40	3.40	3.40 to 3.60	3.40 Conshohocken =3.95	3.45	3.40	3.45	Coatesville=3.75, Claymont=3.95 Geneva=3.40, Harrisburg=6.50			3.65	3.45	4.30[16]	5.80
Floor plates	4.55	4.55		4.55				Conshohocken =4.55							
Alloy	4.40	4.40							Coatesville=5.10						
SHAPES, Structural	3.25 to 3.30	3.25	3.25		3.25	3.30	Bethlehem=3.30, Geneva, Utah=3.25						3.30	3.85 to 4.30	5.75
MANUFACTURERS' WIRE[9] Bright	4.15 to 4.50	4.15 to 4.65		4.15	4.15		4.15	4.25	Duluth=4.15, Worcester=4.45				4.15	5.15[13]	
Spring (high carbon)	5.20	5.20		5.20				5.30	Worcester=5.50 New Haven, Trenton=5.50				5.20	Duluth= 5.20-6.15	
PILING, Steel sheet	4.05	4.05				4.05									

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	Chromium Nickel						Straight Chromium		
	301	302	303	304	316	347	410	416	430
Ingots, rerolling	12.75	13.50	15.00	14.50	22.75	20.00	11.25	13.75	11.50
Slabs, billets, rerolling	17.00	18.25	20.25	19.25	30.25	26.75	15.00	18.50	15.25
Forging discs, die blocks, rings	30.50	30.50	33.00	32.00	49.00	41.00	24.50	25.00	25.00
Billets, forging	24.25–26.50	24.25–26.50	26.25–28.75	25.50–27.75	39.00–42.75	32.75–35.75	19.50–21.50	20.00–21.75	20.00–21.75
Bars, wire, structurals	28.50	28.50	31.00	30.00	46.00	38.50	23.00	23.50	23.50
Plates	32.00	32.00	34.00	34.00	50.50	44.00	26.00	26.50	26.50
Sheets	37.50–40.75	37.50–40.75	39.50–43.00	39.50–43.00	53.00–57.25	50.00–54.00	33.00	33.50	35.50 ....
Strip, hot-rolled	24.25	25.75	30.00	27.75	46.00	38.75	21.25	28.00	21.75
Strip, cold-rolled	30.50–30.75	33.00–33.50	36.50–39.50	35.00–35.75	55.00–57.25	48.50–50.00	27.00	33.50	27.50 .....

ELECTRODES

Cents per lb, f.o.b. plant, threaded electrodes with nipples, unboxed

Diameter in in.	Length in in.	
Graphite		
17, 18, 20	60, 72	16.00¢
8 to 16	48, 60, 72	16.50¢
7	48, 60	17.75¢
6	48, 60	19.00¢
4, 5	40	19.50¢
3	40	20.50¢
2½	24, 30	21.00¢
2	24, 30	23.00¢
Carbon		
40	100, 110	7.50¢
35	65, 110	7.50¢
30	65, 84, 110	7.50¢
24	72 to 104	7.50¢
17 to 20	84, 90	7.50¢
14	60, 72	8.00¢
10, 12	60	8.25¢
8	60	8.50¢

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	90.5¢
18	4	1	—	5	$1.42
18	4	2	—	—	$1.025
1.5	4	1.5	8	—	65¢
6	4	2	6	—	69.5¢
High-carbon-chromium					52¢
Oil harden manganese					29¢
Special carbon					26.5¢
Extra carbon					22¢
Regular carbon					19¢

Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.

ELECTRICAL SHEETS

Base, HR cut lengths, f.o.b. mill

	Cents per lb
Armature	5.45
Electrical	5.95
Motor	6.70 to 9.20
Dynamo	7.50 to 10.00
Transformer 72	8.05 to 11.80
Transformer 65	8.60 to 12.35
Transformer 58	9.30 to 13.05
Transformer 52	10.10

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 quality, per 100 lb	$3.20†
Joint bars, 100 lb	4.25
Light rails (from billets) per 100 lb	3.55

	Base Price cents per lb
Track spikes	5.35
Axles	5.20
Screw spikes	8.00
Tie plates	4.05
Tie plates, Pittsburg, Calif.*	4.20
Track bolts, untreated	8.25
Track bolts, heat treated, to railroads	8.50

*Seattle, add 30¢.

† CF&I $3.35; Inland $3.50.

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon	4.00¢
0.41 to 0.60 carbon	5.50¢
0.61 to 0.80 carbon	6.10¢
0.81 to 1.05 carbon	8.05¢
1.06 to 1.35 carbon	10.35¢

Worcester, add 0.30¢.

CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless clad		
No. 304, 20 pct, f.o.b.		
Coatesville, Pa.	*26.50	
Washington, Pa.	*26.50	*22.50
Claymont, Del.	*26.50	
Conshohocken, Pa.		*22.50
Nickel-clad		
10 pct f.o.b. Coatesville, Pa.	27.50	
Inconel-clad		
10 pct, f.o.b. Coatesville.	36.00	
Monel-clad		
10 pct, f.o.b. Coatesville.	29.00	
Alumnized steel sheets		
Hot dip, 20 gage, f.o.b. Butler, Pa.	....	9.25

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* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. mill

	Base Column	*Pittsburg, Calif.*
Standard & coated nails*	103	123
Galvanized nails*	103	123
Woven wire fence†	109	132
Fence posts, carloads††	114	...
Single loop bale ties	106	130
Galvanized barbed wire**	123	143
Twisted barbless wire	123	...

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* Pgh., Chi., Duluth; Worcester, 6 columns higher. † 15½ gage and heavier. ** On 80 rod spools, in carloads. †† Duluth only.

	Base per 100 lb	*Pittsburg, Calif.*
Annealed fence wire‡	$4.80	$5.75
Annealed, galv. fencing‡	5.25	6.20
Cut nails, carloads‡‡	6.75	....

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‡ Add 30¢ at Worcester; 10¢ at Sparrows Pt.

‡‡ Less 20¢ to jobbers.

HIGH STRENGTH, LOW ALLOY STEELS

Mill base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dyn-alloy	HI Steel	Mayari R	Otis-coloy	Yoloy	NAX High Tensile
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	Great Lakes Steel
Plates	5.20	5.20	5.20	5.30	5.20	5.30	5.20	5.20	5.65
Sheets									
Hot-rolled	4.95	4.95	4.95	5.25	4.95	4.95	4.95	4.95	5.25
Cold-rolled	6.05	6.05	6.05	...	6.05	6.05	6.05	6.05	6.35
Galvanized	. .	6.75	....	....	....	6.75	....	....	....
Strip									
Hot-rolled	4.95	4.95	4.95	....	4.95	4.95	4.95	4.95	5.25
Cold-rolled	....	....	6.05	....	....	6.05	6.05	....	6.35
Shapes	....	4.95	....	....	4.95	5.05	4.95	....	....
Beams	....	4.95	....	....	....	....	....	....	....
Bars									
Hot-rolled	5.10	5.10	5.10	....	5.10	5.10	5.10	....	5.40
Bar shapes	....	5.10	....	....	5.10	5.10	5.10	....	....

PIPE AND TUBING

Base discounts, f.o.b. mills,
Base price, $200.00 per net ton.

STANDARD, THREADED AND COUPLED

Steel, buttweld	*Black*	*Galv.*
½-in.	43 to 41	20 to 18
¾-in.	46 to 44	24 to 22
1-in.	48½ to 46½	27 to 25
1¼-in.	49 to 47	27½ to 25½
1½-in.	49½ to 47½	28 to 26
2-in.	50 to 48	28½ to 26½
2½ to 3-in.	50½ to 49½	29 to 27
Steel, lapweld		
2-in.	39½	17½
2½ to 3 in.	39½	21½
3½ to 6 in.	46½ to 42	20½ to 24½
Steel, seamless		
2-in.	38½ to 27	16½ to 5
2½ to 3-in	41½ to 35	19½ to 10½
3½ to 6-in.	43½ to 38½	21½ to 16½
Wrought Iron, buttweld		
½-in.	+20½	+52½
¾-in.	+10½	+41½
1 & 1¼-in.	+ 4½	+32½
2-in.	— 1½	+29
3-in.	— 2	+28½
Wrought Iron, lapweld		
2-in.	+ 7½	+36½
2½ to 3½-in.	+ 5	+32
4-in.	list	+26
4½ to 8-in.	+ 2	+27½

EXTRA STRONG, PLAIN ENDS

Steel, buttweld		
½-in.	42 to 40	20½ to 18½
¾-in.	46 to 44	24½ to 22½
1-in.	48 to 46	27½ to 25½
1¼-in.	48½ to 46½	28 to 26
1½-in.	49 to 47	28½ to 26½
2-in.	49½ to 47½	29 to 27
2½ to 3-in.	50 to 48	29½ to 27½
Steel, lapweld		
2-in.	39½	18½
2½ to 3-in.	44½	23½
3½ to 6-in.	48 to 44	23 to 27
Steel, seamless		
2-in.	37½ to 32½	16½ to 11½
2½ to 3-in.	41½ to 36½	20½ to 15½
3½ to 6-in.	45	24
Wrought Iron, buttweld		
½-in.	+16	+46½
¾-in.	+ 9½	+39½
1 to 2-in.	— 1½	+28½
Wrought Iron, lapweld		
2-in.	+ 4½	+33
2½ to 4-in.	— 5	+21½
4½ to 6-in.	— 1	+26

For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut length 4 to 24 ft inclusive.

OD in in.	Gage BWG	Seamless H.R.	Seamless C.R.	Electric Weld H.R.	Electric Weld C.D.
2	13	19.18	22.56	18.60	21.89
2½	12	25.79	30.33	25.02	29.41
3	12	28.68	33.76	27.82	32.74
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78

CAST IRON WATER PIPE

	Per net ton
6 to 24-in., del'd Chicago	$106.70
6 to 24-in., del'd N. Y.	103.50 to 108.40
6 to 24-in., Birmingham	93.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less	120.30

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

	Pct Off List
½ in. & smaller x 6 in. & shorter	35
9/16 & ⅝ in. x 6 in. & shorter	37
¾ in. & larger x 6 in. & shorter	34
All diam, longer than 6 in.	30
Lag, all diam over 6 in. longer	35
Lag, all diam x 6 in. & shorter	37
Plow bolts	47

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	35
9/16 to 1 in. inclusive	34
1⅛ to 1½ in. inclusive	32
1⅝ in. and larger	27

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifinished Hexagon Nuts

	USS	SAE
7/16 in. and smaller	..	41
½ in. and smaller	38	..
½ in. through 1 in.	..	39
9/16 in. through 1 in.	37	..
1⅛ in. through 1½ in.	35	37
1⅝ in. and larger	28	..

In full case lots, 15 pct additional discount.

Stove Bolts

Packages, nuts separate	$61.75
In bulk	70.00

Large Rivets

(½ in. and larger)	*Base per 100 lb*
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$6.75
F.o.b. Lebanon, Pa.	6.75

Small Rivets

(7/16 in. and smaller)	*Pct off List*
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	48

Cap and Set Screws

(In packages)	*Pct Off List*
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	46
¾ to 1 in. x 6 in., SAE (1035), heat treated	35
Set screws, oval points	
Milled studs	19
Flat head cap screws, listed sizes	5
Fillister head cap, listed sizes	28

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill.

Effective CaF, Content:	*Base price per net ton*
70% or more	$37.00
60% or less	34.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, Bessemer	$6.60
Old range, nonbessemer	6.45
Mesabi, bessemer	6.35
Mesabi, nonbessemer	6.20
High phosphorus	6.20

Increases or decreases in freight rates, dock handling charges and taxes after Apr. 1, 1948, are to be added to above prices.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	7.9¢ to 9.0¢
Domestic sponge iron, 98+% Fe, carload lots	9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe	19.5¢ to 39.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 microns, 98%, 99.8%+ Fe.	90.0¢ to $1.75
Aluminum	30.00¢
Antimony	51.17¢
Brass, 10 ton lots	27.25 to 37.25¢
Copper, electrolytic	33.625¢
Copper, reduced	34.25¢
Cadmium	$2.55
Chromium, electrolytic, 99% min.	$3.50
Lead	27.80¢
Manganese	55.00¢
Molybdenum, 99%	$2.65
Nickel, unannealed	66.00¢
Nickel, spherical, minus 30 mesh, unannealed	68.00¢
Silicon	34.00¢
Solder powder	8.5¢ plus metal cost
Stainless steel, 302	75.0¢
Tin	$1.155
Tungsten, 99%	$2.90
Zinc, 10 ton lots	17.75 to 22.25¢

COKE

	Net Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.50 to $15.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.00 to $18.00
Foundry, Byproduct	
Buffalo	$22.75 to $23.10
Chicago, del'd	23.90
Chicago, f.o.b.	20.85
Detroit, f.o.b.	19.40
New England, del'd	22.75
Seaboard, N. J., f.o.b.	21.50
Philadelphia, f.o.b.	20.55
Swedeland, Pa., f.o.b.	20.50
Painesville, Ohio, f.o.b.	20.90
Erie, del'd	19.95
Cleveland, del'd	22.45
Cincinnati, del'd	21.40
St. Paul, del'd	23.17
St. Louis, del'd	20.98
Birmingham, del'd	18.66

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick	*Carloads, Per* 1000
First quality, Pa., Md., Ky., Mo. (except Salina, Pa., add $5)	$80.00
No. 1 Ohio	74.00
Sec. quality, Pa., Md., Ky., Mo.	74.00
No. 2 Ohio	66.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	11.50
Silica Brick	
Mt. Union, Pa., Ensley, Ala.	$80.00
Childs, Pa.	84.00
Hays, Pa.	85.00
Chicago District	89.00
Western, Utah and Calif.	95.00
Super Duty, Hays, Pa., Athens, Tex.	85.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	$13.75 to 14.00
Silica cement, net ton, bulk, Hays, Pa.	16.00
Silica cement, net ton, bulk, Ensley, Ala.	15.00
Silica cement, net ton, bulk, Chicago District	14.75
Silica cement, net ton, bulk, Utah and Calif.	21.00
Chrome Brick	*Per Net Ton*
Standard chemically bonded, Balt., Chester	$69.00
Magnesite Brick	
Standard, Balt. and Chester	$91.00
Chemically bonded, Balt. and Chester	80.00
Grain Magnesite	*Std. ⅝-in. grains*
Domestic, f.o.b. Balt. and Chester, in bulk, fines removed	$56.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines	$30.50 to 31.00
in sacks with fines	35.00 to 35.50
Dead Burned Dolomite	
F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk. Midwest, add 10¢; Missouri Valley, add 20¢	$12.25

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, per 100 lb.
(Metropolitan area delivery, add 15¢ to base, except New York, add 20¢)

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia	$5.15-5.71	$6.31-6.57	$7.27-7.52	$5.35-5.66	$6.51	$5.37-5.52	$5.09-6.24	$5.35-5.57	$6.16-6.31	$9.14	$9.29	$10.54	$10.69
New York	5.40-5.98	6.28-6.43	7.25-7.89	5.58-5.88	6.48-6.73	5.78	5.32-5.58	5.53-5.63	6.18-6.38	9.17-9.53	9.32-9.68	10.40-10.77	10.55-10.92
Boston	5.48-5.64	6.39	7.56-7.83	5.54-5.89	6.75-6.79	5.74	5.39-5.54	5.48-5.59	6.24-6.34	9.40-9.44	9.55-9.59	10.84-10.94	10.92-11.09
Baltimore	5.28	6.18	7.15-7.38	5.34	....	5.53	5.33-5.39	5.39	6.13	....	....	....	....
Chicago	4.85-5.10	5.75-5.95	7.15-7.30	4.85-5.30	6.15	5.10	4.90	4.90	5.70	9.35	9.60	10.80	11.05
Milwaukee	5.02-5.07	5.92	7.12-7.47	5.02-5.37	6.32	5.22-5.27	5.07	5.07	5.87	9.15-9.17	9.32	10.52-10.57	10.67-10.72
Norfolk	5.75	....	....	....	....	6.00	6.00	6.00	....	....	....	....	....
Cleveland	4.98-5.20	5.75[1]-6.04[1]	7.18-7.44	5.02-5.65	6.70	5.35-5.54	5.16-5.42	5.15-5.34	5.70-5.95	9.14-9.66	9.29-9.89	11.05	11.30
Buffalo	4.85-5.10	5.75-5.85	7.55-7.80	5.55-5.56	6.35	5.45-5.46	5.10	5.15-5.20	5.90-6.05	9.05-9.35	9.40-9.50	10.75	20.90
Detroit	5.20-5.55	6.05-6.50	7.70	5.25-5.70	6.25-6.55	5.50-5.55	5.30-5.37	5.30-5.52	6.02-6.07	9.31-9.55	9.20-9.47	10.72-10.95	10.87-11.10
Cincinnati	5.14-5.36[8]	5.82-6.21[8]	6.97-7.65	5.25-5.62[8]	6.31	5.50-5.71[8]	5.30-5.47[8]	5.30-5.62[8]	6.06-6.17[8]	9.31-9.35	9.50-9.51	10.75-10.76	10.90-10.91
St. Louis	5.19	6.04-6.09	7.29-7.64	5.19-5.79	6.49	5.39-5.44	5.24	5.24	6.04	9.69	9.94	11.14	11.39
Pittsburgh	4.85-4.90	5.75[1]	7.15	5.00-5.35	5.95	5.05-5.25	4.90-5.15	4.90-5.10	5.65-5.80	9.35	9.60	10.40	10.55-10.80
St. Paul	5.41	6.31	7.30-7.71	5.41	....	5.66	5.46	5.46	6.26	9.91	10.10	11.36	11.61
Omaha	5.92	....	9.18	5.92	....	6.17	5.97	5.97	6.77	....	....	....	....
Birmingham	5.05[1]	6.36	6.45	5.05[11]	6.36	5.25[11]	5.00[11]	5.00[11]	6.66	....	....	....	....
Houston	6.40	....	8.80	6.75	....	6.35	6.20	6.40	7.60	9.80	9.85	10.75	10.95
Los Angeles	6.30-6.40	7.85[1]-7.90	7.95-8.90	6.60-6.66	9.35[5]	6.10-7.40	5.75-5.90	6.05	7.85[15]-8.45	10.90	10.85	12.40	12.65
San Francisco	5.95[8]	7.15[2]	8.25-8.90	6.75[8]	8.25	6.30-7.60	5.90-6.90	5.90	7.55	10.90	10.85	12.40	12.65
Portland	6.50[4]	8.00[2]	8.15[2] 8.45[2]	6.85[4]	....	6.30[4]	6.25[4]	6.25[4]	8.25[4]	....	10.45[15]	....	12.05[15]
Seattle	6.20[4]-6.30[4]	7.75[2]-7.85[2]	7.65 8.00	6.55[4]-6.65[4]	....	6.20-6.30	6.15-6.25	6.05[4]-6.15[4]	8.00[14]-8.10[14]	....	10.30[15]-10.40[15]	....	12.00[15]-12.05[15]
Salt Lake City	7.05-8.00	8.20	7.90-9.06	7.10-7.59	....	5.75-6.65	6.65-7.00	6.95-7.25	7.55-8.40	....	....	....	..

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED:

Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED:

Sheets, 400 to 1999 lb; strip, extras on all quantities bars 1000 lb and over.

ALLOY BARS:

1000 to 1999 lb.

GALVANIZED SHEETS:

450 to 1499 lb.

EXCEPTIONS:

(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight.

PRODUCING POINT PRICES

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	48.00	.....	.....	.....	.....
Birmingham	42.88	43.38		.....	.....
Buffalo	47.00-48.00*	47.00-48.00*	47.50-48.50*	.....	.....
Chicago	46.00	46.00	46.50	47.00	
Cleveland	46.00	46.50	46.50	47.00	51.00
Duluth	46.00	46.00	46.50	47.00	
Erie	45.50	46.00	46.50	47.00	.....
Everett	.....	49.50	50.00	....	.....
Granite City	47.90	48.40	48.90	.....	.....
Ironton, Utah	62.00	62.50	.....	.....	.....
Lone Star, Texas	.....	75.00†	.....	.....	.....
Neville Island	46.00	46.50	46.50	.....	.....
Provo	46.00	46.50	.....	.....	.....
Sharpsville	46.00	46.50	46.50	47.00	.....
Steelton	48.00	48.50	49.00	49.50	54.00
Struthers, Ohio	46.00	.....	.....	.....	.....
Swedeland	50.00	50.50	51.00	51.50	.....
Toledo	45.50	46.00	46.50	47.00	.....
Troy, N. Y.	.....	.....	.....	.....	54.00
Youngstown	46.00	46.50	46.50	.....	

DELIVERED PRICES† (BASE GRADES)

Consuming Point	Producing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$0.50 Arb.	..	49.50	50.00	....	....
Boston	Steelton	6.27	54.27	54.77	55.27	55.77	60.27
Brooklyn	Bethlehem	3.90	51.90	..	.....	.....	.....
Cincinnati	Birmingham	6.09	48.97	49.47	.....	.....	.....
Jersey City	Bethlehem	2.39	50.39		.....	.....	.....
Los Angeles	Provo	6.93	52.93	53.43	.....	.....	.....
Mansfield	Cleveland-Toledo	3.03	49.03-48.53	49.53-49.03	49.53	50.03	54.03
Philadelphia	Bethlehem	2.21	50.21	.....	.....	.....	.....
Philadelphia	Swedeland	1.31	51.31	51.81	52.31	52.81	.....
Philadelphia	Steelton	2.81	50.81	51.31	51.81	52.31	56.81
San Francisco	Provo	6.93	52.93	53.43	.....	.....	
Seattle	Provo	6.93	52.93	53.43	.	.....	...
St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65	.....	.....

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* Republic Steel Corp. price: Basis: pig iron at Buffalo set by average price of No. 1 hvy. mlt. steel scrap at Buffalo as shown in last week's issue of THE IRON AGE. Price is effective until next Sunday midnight.

† Low Phos, Southern Grade.

Producing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.00 to 6.50 pct. C/L per g.t., f.o.b. Jackson, Ohio —$59.50; f.o.b. Buffalo $60.75. Add $1.25 per ton for each additional 0.50 pct Si. up to 12 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus $66.00 per gross ton, f.o.b. Lyles, Tenn. Delivered Chicago, $73.78. High phosphorus charcoal pig iron is not being produced.

Ferromanganese

78-82% Mn, Maximum contract base price, gross ton, lump size.

F.o.b. Birmingham	$162
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont.	$160
F.o.b. Johnstown, Pa.	$162
F.o.b. Sheridan, Pa.	$160
F.o.b. Rockwood, Tenn.	$165
F.o.b. Etna, Pa.	$163

$2.00 for each 1% above 82% Mn; penalty, $2.00 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.0
Ton lots	11.6
Less ton lots	12.5

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$61.00	$62.00
Pgh. or Chicago	65.00	66.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, packed	35.5
Ton lots	37.0

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, delivered.

	Carloads	Ton	Less
0.07% max. C. 0.06% P, 90% Mn.	25.25	27.10	28.30
0.10% max. C	24.75	26.60	27.80
0.15% max. C	24.25	26.10	27.30
0.30% max. C	23.75	25.60	26.80
0.50% max. C	23.25	25.10	26.30
0.75% max. C, 7.00% max. Ci	20.25	22.10	23.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C.

Carload bulk	8.60
Ton lots	10.25
Briquet, contract basis, carlots, bulk delivered, per lb of briquet	10.0
Ton lots	11.6
Less ton lots	12.5

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct., f.o.b. Keokuk, Iowa, openhearth $84.00, foundry, $85.00; $84.75 f.o.b. Niagara Falls; Electric furnace silvery iron is not being produced at Jackson. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50 pct. Mn over 1 pct.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	20.70
97% Si, 1% Fe	21.10

Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 1 lb Si briquets.

Carload, bulk	5.90
Ton lots	7.50
Less ton lots	8.40

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size, bulk, in carloads, delivered.

25% Si	17.50
50% Si	10.50
75% Si	13.00
85% Si	14.65
90-95% Si	16.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max. Si)

0.06% C	28.75
0.10% C	28.25
0.15% C	28.00
0.20% C	27.75
0.50% C	27.50
1.00% C	27.25
2.00% C	27.00
65-69% Cr, 4-9% C	20.50
62-66% Cr, 4-6% C, 6-9% Si	21.35

Briquets — Contract price, cents per pound of briquet, delivered, 60% chromium.

Carload, bulk	13.75
Ton lots	15.25
Less ton lots	16.15

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carload	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carload	27.75
Ton lots	30.05
Less ton lots	31.85

Chromium Metal

Contract prices, cents per lb. chromium contained packed, delivered, ton lots. 97% min. Cr. 1% max. Fe.

0.20% max. C.	1.09
0.50% max. C.	1.05
9.00% min. C.	1.04

Calcium—Silicon

Contract price per lb. of alloy, lump, delivered.

30-33% Ca, 60.65% Si, 3.00% max. Fe.

Carloads	17.90
Ton lots	21.00
Less ton lots	22.50

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	19.25
Ton lots	21.55
Less ton lots	22.55

CMSZ

Contract price, cents per pound of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	19.75
Less ton lots	21.00

V Foundry Alloys

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn. V-7: 28.32% Cr, 15-21% Si, 14-16% Mn.

Ton lots	15.75¢
Less ton lots	17.00¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Ton lots and carload packed	18.00¢
Less ton lots	19.50¢

SMZ

Contract price, cents per pound of alloy, delivered. 60-65% Si, 5-7 Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.25
Less ton lots	18.50

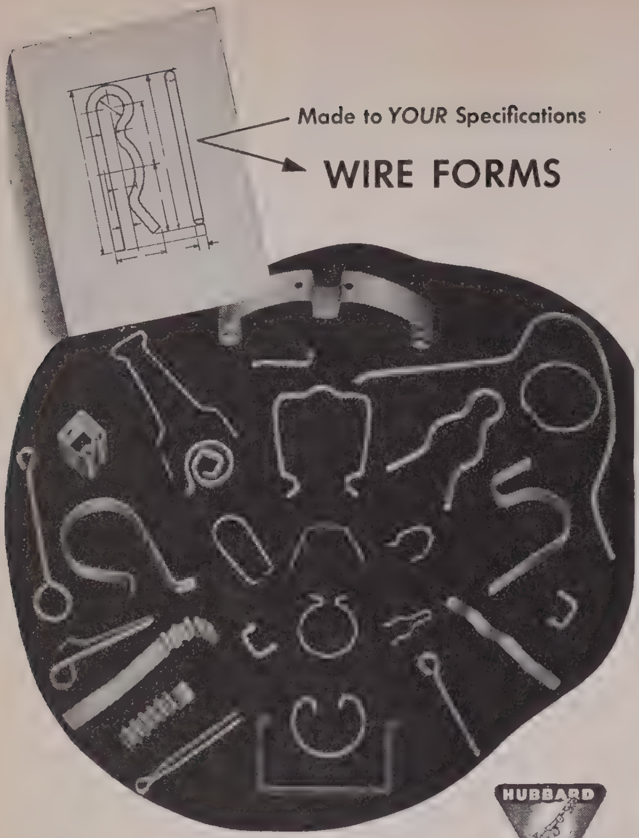
Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered	$2.25
Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained, V.	
Openhearth	$2.90
Crucible	3.00
High speed steel (Primos)	3.10
Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound Contained V_2O_5	$1.20
Ferrocolumbium, 50-60% contract basis, delivered, per pound contained Cb.	
Ton lots	$2.75
Less ton lots	2.80
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo.	95¢
Calcium molybdate, 45-50%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo.	80¢
Molybdenum oxide briquets, f.o.b. Langeloth and Washington, Pa., per pound contained Mo.	80¢
Molybdenum oxide in bags, f.o.b. Langeloth and Washington, Pa., per pound contained Mo.	80¢
Ferrotitanium, 40-45%, 0.10% C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti	$1.23
Ferrotitanium, 20-25%, 0.10% C max., ton lots, per pound contained Ti	$1.40
Less ton lots	1.45
High carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton	$160.00
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton	$65.00
10 tons to less carload	75.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Ton lots	21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per pound of alloy.	
Carload, bulk	6.60¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	8.40¢
Ton lots	9.30¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk	11.00
Ton lots, packed	11.25
Less ton lots	11.75

Boron Agents

Contract prices per pound of alloy, delivered.

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D.	
Ton lot	$1.20
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. X D, delivered.	
Ton lots	$1.67
Less ton lots	1.79
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	$1.80
Silcaz, contract basis, delivered.	
Ton lots	45.00¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1	93¢
No. 6	63¢
No. 79	45¢
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, f.o.b. Suspension Bridge, N. Y., freight allowed, Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%.	
Ton lots, per pound	8.625¢
Borosil, f.o.b. Philo. Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	$6.25



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Capacities by Products and Plants

New York

• • • **Following** is the second part of product capacities by plants. THE IRON AGE has selected the more common products and lists them for the reader's convenience. The first part appeared in last week's issue in this same section.

Hot Rolled Strip

Companies:	Annual capacity (N. T.)
Acme Steel Company	545,000
Allegheny Ludlum Steel Corporation	130,000
Atlantic Steel Company	25,500
Borg-Warner Corporation	3,000
Buffalo Bolt Company	600
Colorado Fuel and Iron Corporation	600
Connors Steel Company	14,000
Inland Steel Company	15,000
International Harvester Company	35,000
Jones & Laughlin Steel Corporation	44,000
Joslyn Manufacturing & Supply Company	5,000
Kaiser Company, Inc.	45,000
Knoxville Iron Company	6,000
Laclede Steel Company	48,500
McLouth Steel Corporation	96,000
National Steel Corporation.	
Great Lakes Steel Corporation	240,000
Republic Steel Corporation	494,000
Roebling's Sons Company (John A.)	17,000
Sharon Steel Corporation	600,000
Simonds Saw and Steel Company	780
Stanley Works	150,000
Superior Steel Corporation	115,000
United States Steel Corporation:	
American Steel and Wire Company	82,120
Carnegie-Illinois Steel Corporation	760,030
Columbia Steel Company	8,860
Tennessee Coal, Iron and Railroad Co.	8,200
Total	859,210
Washburn Wire Company	31,200
Youngstown Sheet and Tube Company	7,200
Grand Total	3,527,590

Strip for Cold Reduced Black Plate and Tin Plate

Companies:	Annual capacity (N. T.)
Bethlehem Steel Corporation:	
Bethlehem Steel Company	890,000
Granite City Steel Company	120,000
Inland Steel Company	195,000
Jones & Laughlin Steel Corporation	360,000
National Steel Corporation:	
Weirton Steel Company	(a)
Republic Steel Corporation	250,000
United States Steel Corporation:	
Carnegie-Illinois Steel Corporation	1,351,300
Tennessee Coal, Iron and Railroad Co.	624,000
Total	1,975,300
Youngstown Sheet and Tube Company	324,000
Grand Total	4,114,300

(a) Included in capacity of hot rolled sheets.

Skelp

	Annual Capacity (N. T.)		
Companies:	Steel	Iron	Total
Bethlehem Steel Corporation:			
Bethlehem Steel Company	405,000	......	405,000
Borg-Warner Corporation	10,000	......	10,000
Byers Company, A. M.	......	310,000	310,000
Jones & Laughlin Steel Corporation	420,000	......	420,000
Kaiser Company, Inc.	153,000	......	153,000
Laclede Steel Company	80,000	......	80,000
Republic Steel Corporation	1,103,000	......	1,103,000
United States Steel Corporation:			
Carnegie-Illinois Steel Corporation	344,900	......	344,900
National Tube Company	509,000	......	509,000
Total	853,900	......	853,900
Wheeling Steel Corporation	327,000	......	327,000
Youngstown Sheet and Tube Company	744,000	......	744,000
Grand Total	4,095,900	310,000	4,405,900

(CONTINUED ON PAGE 200)

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BRANCHES: PHILADELPHIA • CHICAGO • BERKELEY, CALIF.
MANUFACTURERS OF THE FAMOUS OWEN CLAMSHELL BUCKETS

"KELITE" REG. U. S. PAT. OFF. • pH CHART COPYRIGHTED 1942 BY KELITE PRODUCTS, INC.

KELITE
SCIENTIFIC CLEANING THROUGH pH CONTROL

KELITE pH Control

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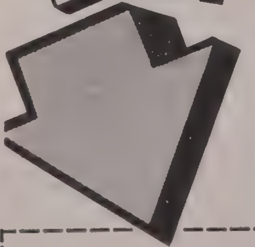

See for yourself how retarded evaporation gives fast, thorough action to Kelite Paint Lift. Learn the facts—absolutely free—simply by mailing the coupon below.

KELITE PRODUCTS, INC.
P. O. BOX 2917—TERMINAL ANNEX, LOS ANGELES 54, CALIF.

I am interested in free ☐ SAMPLE ☐ DEMONSTRATION
of Kelite Paint Lift for paint stripping.

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Company ____________
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Fully Established Manufacturing Business Producing

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or
- Component of Durable Consumer PRODUCT

Our client, a well established manufacturer, is experienced in this type of business and desires to purchase or merge with a business offering a machinery line which has annual sales of $500,000 up.

Will retain competent executive personnel.

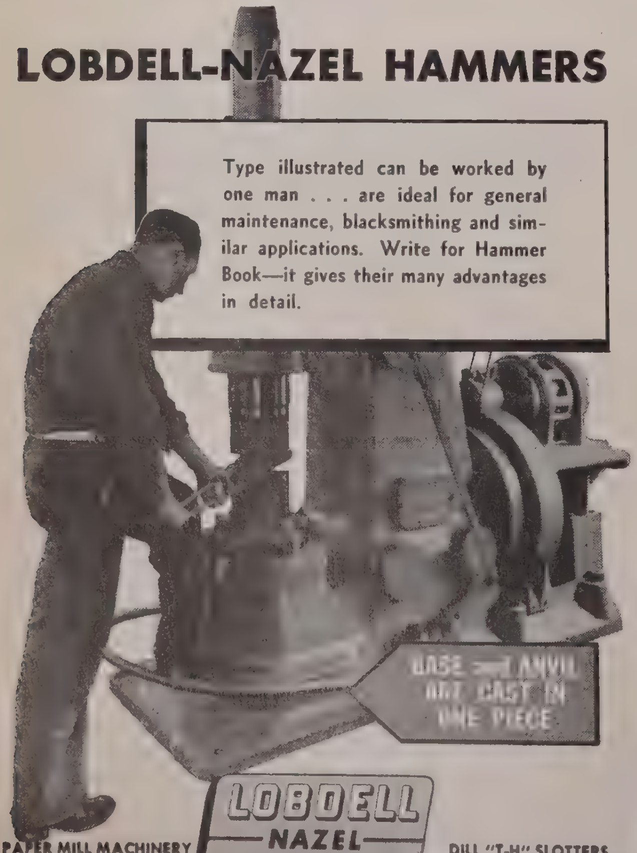
Please write Department "A-5" enclosing this ad. Your reply will be held in confidence if desired.

We are fully compensated by our client.

Charles H. Welling & Co., Inc.

52 Vanderbilt Avenue, New York 17, N. Y.

Consultants in New Product Development


LOBDELL-NAZEL HAMMERS

Type illustrated can be worked by one man . . . are ideal for general maintenance, blacksmithing and similar applications. Write for Hammer Book—it gives their many advantages in detail.

PAPER MILL MACHINERY
FORGING HAMMERS

LOBDELL
NAZEL
FORGING HAMMERS

DILL "T-H" SLOTTERS
ROLLS FOR ALL INDUSTRIES

LOBDELL COMPANY ESTABLISHED 1836 WILMINGTON 99, DEL.

(CONTINUED FROM PAGE 198)

Strip (Cold Rolled and Galvanized)

Companies:	Annual Capacity (N. T.) Cold rolled strip	Annual Capacity (N. T.) Galvanized strip
Acme Steel Company	435,000	95,000
Allegheny Ludlum Steel Corporation	100,000	......
Wallingford Steel Company	40,000	......
Total	140,000	......
Alloy Metal Wire Company, Inc.	400	......
American Shim Steel Company	12,000	......
Atlantic Steel Company	......	13,140
Blair Strip Steel Company	18,000	......
Buffalo Bolt Company	2,500	......
California Cold Rolled Steel Corporation	31,200	......
Carpenter Steel Company	8,500	......
Cleveland Cold Rolling Mills Company	240	......
Cold Metal Products Company	90,000	......
Crucible Steel Company of America	7,800	......
Detroit Steel Corporation	150,000	......
Disston & Sons, Inc., Henry	780	......
Elliott Brothers Steel Company	19,000	......
Follansbee Steel Corporation	180,000	......
Greer Steel Company	72,000	9,000
Griffin Manufacturing Company	36,000	......
Hind Steel Company, Inc.	5,000	......
Inland Steel Company	24,000	......
Jessop Steel Company	1,000	......
Jones & Laughlin Steel Corporation	42,000	......
Kaiser Company, Inc.	18,000	......
McLouth Steel Corporation	69,000	......
National-Standard Company	6,000	......
National Steel Corporation:		
Great Lakes Steel Corporation	60,000	......
Weirton Steel Company	105,000	70,000
Total	165,000	70,000
Newman-Crosby Steel Corporation	20,000	......
Republic Steel Corporation	210,000	......
Rhode Island Steel Corporation	3,000	......
Roebling's Sons Company, John A.	22,500	10,000
Rome Strip Steel Company, Inc.	14,400	......
Sharon Steel Corporation	100,000	60,000
Brainard Steel Company	25,000	15,000
Detroit Tube & Steel Company	78,000	......
Total	203,000	75,000
Simonds Saw & Steel Company	200	......
Stanley Works	164,000	......
Superior Steel Corporation	85,000	......
Thomas Steel Company	65,000	30,000
Thompson Wire Company	40,000	......
United States Steel Corporation:		
American Steel and Wire Company	238,820	36,810
Columbia Steel Company	......	47,600
Total	238,820	84,410
Universal-Cyclops Steel Corporation	15,000	......
Wallace Barnes Company	10,000	......
Washburn Wire Company	23,100	......
Worcester Pressed Steel Company	7,500	......
Grand Total	2,654,940	386,550

Ordinary and Chemically Treated Black Plate, Hot Dipped Tin and Terne Plate, and Electrolytic Tin Plate

Companies:	Annual Capacity (N. T.) Ordinary black plate	Annual Capacity (N. T.) Chemically treated black plate	Annual Capacity (N. T.) Hot dipped tin and terne plate	Annual Capacity (N. T.) Electrolytic tin plate
Bethlehem Steel Corporation:				
Bethlehem Steel Company	10,000	74,000	648,000	290,000
Granite City Steel Company	......	......	70,000	50,000
Inland Steel Company	......	......	192,000	60,000
Jones & Laughlin Steel Corporation	77,000	......	408,000	160,800
National Steel Corporation:				
Weirton Steel Company	20,000	......	*636,250	*390,000
Republic Steel Corporation	......	20,000	190,000	110,000
United States Steel Corporation:				
Carnegie-Illinois Steel Corporation	†186,000	......	617,900	667,300
Tennessee Coal, Iron and Railroad Co.	......	23,500	415,000	188,000
Total	186,000	23,500	1,032,900	855,300
Wheeling Steel Corporation	150,000	......	315,000	110,000
Youngstown Sheet and Tube Company	30,000	......	222,000	150,000
Grand Total	473,000	117,500	3,714,150	2,176,100

*The combined capacity for hot dipped and electrolytic tin plate is limited to 800,000 tons.

†Includes capacity of chemically treated black plate.

(CONTINUED ON PAGE 202)

Metal Stamping Facilities by

LANSING

At Your Service For

LAWNMOWERS · HOUSEHOLD APPLIANCES · TRANSPORTATION EQUIP. INDUSTRIAL EQUIP. · FARM IMPLEMENTS

LANSING STAMPING CO.

OVER 30 YEARS EXPERIENCE

LANSING 2, MICHIGAN

THE CLEVELAND STEEL TOOL CO.

Punches, Dies, Chisels, Rivet Sets

660 E. 82^D St. Cleveland, O.

If it's RIVETED you KNOW it's safe

Severance CARBIDE MIDGET MILLS

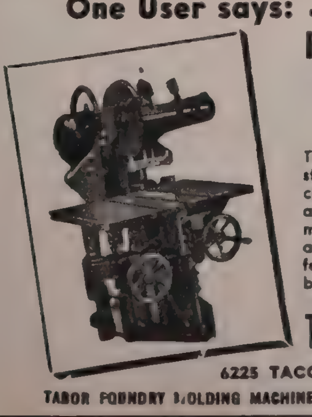
Operate at grinding-wheel speeds
Outlast scores of mounted points
Cut 50 times faster
MANY SHAPES and SIZES
Cut hard materials - Rockwell 65-C

Write for Catalog No. 16

May be REGROUND time-after-time by Severance—savings are thus multiplied

SEVERANCE TOOL INDUSTRIES, INC.

747 Iowa Ave., Saginaw, Michigan



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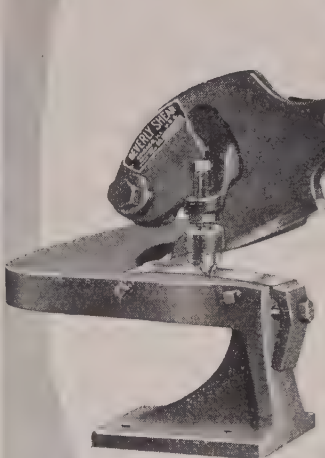
THE TABOR-BRASIVE CUTOFF MACHINE

This is characteristic of Tabor installations. All users are satisfied customers. If you are cutting gates and risers from alloy steel or from manganese bronze, nickel, monel, aluminum bronze and other non-ferrous alloys, you can't afford to be without one.

THE TABOR MFG. CO.

6225 TACONY ST., PHILADELPHIA, PA.

TABOR FOUNDRY MOLDING MACHINES • TAYLOR NEWBOLD COLD SAWS



Beverly THROATLESS SHEAR

- UNIVERSAL . . . makes intricate, angular, radii and straight cuts with equal efficiency.
- Positive rake produces neat, clean edges free of burr.
- Free-cutting . . . handles lightest material without distortion.
- Compound leverage . . . great power with little effort.
- High grade tool steel blades adjustable for wear. Easily replaced.
- B-3 Model (illustrated) has ball-bearing hold down for easy control of heavier gauges.

Beverly Shears also available with H.C. H.C. blades for handling Stainless.

See your Dealer . . . or write direct for information and illustrated Catalogs.

Made in 3 models to handle 14 gauge, 10 gauge and 1/8". Welded, all-steel stands available for Beverly Shears.

The BEVERLY SHEAR MFG. Co.
3014 W. 111th St.
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"NEWARK GEAR"

Gear Cutting Machines

•

NEWARK GEAR CUTTING MACHINE CO.

69 Prospect St., Newark, N. J.

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DROP-FORGINGS

ANY SHAPE · ANY MATERIAL · COMPLETE FACILITIES

Write for Free Forging Data Folder . . . Helpful, Informative

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THE INTERNATIONAL HARDNESS SCALES
(BRINELL-SHORE)
are included in Our Improved Portable Scleroscope Model D-1. This efficient Single Scale tester registers Brinell-Shore values under otherwise inaccessible conditions. 100% portable for floor and field work, dead soft metals or superhard steel either of brittle or thin cross sections, non-destructive, accurate, speedy, always ready and fool-proof.
Send for Interesting Technical Bulletin and Prices.
THE SHORE INSTRUMENT & MFG. CO., INC.
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SINCE 1832
Bradley
The name to remember for CUSHIONED POWER HAMMERS
C. C. BRADLEY & SON, INC. Syracuse, N.Y.

WETHERELL BROS. CO.
STEEL
ESTABLISHED 1870
251 Albany St., Cambridge, Mass.
C. R. Strip Stainless Steel
Tool Steel O. H. Specialties

Certified MALLEABLE IRON Castings
Detachable and Riveted Sprocket Chain, Malleable Washers, Tank Lugs, Oarlocks. Catalogues on request.
PEORIA MALLEABLE CASTINGS CO.
PEORIA, ILLINOIS, U. S. A.

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AISC
Structural Steel — Buildings & Bridges
Riveted — Arc Welded Cable Address — Beliros
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WIRE—STRIP, COILED
FOR ELECTRIC FUSE ELEMENTS
EYELETS ALSO BRASS or STEEL
THE PLATT BROS. & CO., WATERBURY, CONN.

STANLEY STEEL
STEEL MAKERS SINCE 1871
HOT ROLLED COLD ROLLED SPECIAL CARBON ALLOYS
THE STANLEY WORKS
NEW BRITAIN, CONN. • BRIDGEPORT, CONN. • HAMILTON, ONTARIO

HIGH SILICON IRON
JISCO
SILVERY
ESSENTIAL FOR ALL FERROUS METALLURGY
THE JACKSON IRON & STEEL CO. - JACKSON, OHIO

(CONTINUED FROM PAGE 200)

Structural Shapes and Rolled Steel Piling

	Annual Capacity (N. T.) Structural Shapes Heavy	 Light	 Steel Piling
Companies:			
Armco Steel Corporation:			
Sheffield Steel Corporation	71,000	42,250	
Atlantic Steel Corporation		16,000	
Bethlehem Steel Corporation:			
Bethlehem Steel Company	1,551,000	248,000	128,000
Bethlehem Pacific Coast Steel Corporation	144,000		
Total	1,695,000	248,000	128,000
Boiardi Steel Corporation		50,000	
Colorado Fuel and Iron Corporation	55,000	20,000	
Inland Steel Company	250,000	100,000	5,000
International Harvester Company	22,000		
Jones & Laughlin Steel Corp.	110,000	50,000	
Kaiser Company, Inc.	72,000	7,000	
Knoxville Iron Company		22,000	
Laclede Steel Company		15,000	
National Steel Corporation:			
Weirton Steel Company	a200,000		
Northern Steel Inc.		3,500	
Pacific States Steel Corporation		50,000	
Phoenix-Apollo Steel Company	224,000	35,000	
United States Steel Corporation:			
Carnegie-Illinois Steel Corp.	2,067,500	331,000	114,400
Columbia Steel Company	17,430	10,320	
Geneva Steel Company	250,000		
Tennessee Coal, Iron & R.R. Co.	180,000		
Total	2,514,930	341,320	114,400
West Virginia Steel and Mfg. Co.	5,000	20,000	
Youngstown Sheet & Tube Co.	18,000	38,400	
Grand Total	5,236,930	1,058,470	247,400

---

a Includes steel piling and tie plates.

Hot Rolled Sheets

	Annual capacity (N. T.)
Companies:	
Alan Wood Steel Company	77,500
Allegheny Ludlum Steel Corporation	135,000
Armco Steel Corporation	1,428,500
Sheffield Steel Corporation	32,500
Total	1,461,000
Bethlehem Steel Corporation:	
Bethlehem Steel Company	2,320,000
Borg-Warner Corporation	265.000
Continental Steel Corporation	95,000
Crucible Steel Company of America	16,800
Disston & Sons, Inc., Henry	10,600
Eastern Stainless Steel Corporation	25,000
Empire Steel Company	120,000
Follansbee Steel Corporation	50,000
Ford Motor Company	840,000
Granite City Steel Company	280,000
Inland Steel Company	1,000,000
International Detrola Corporation	180,000
International Harvester Company	18,000
Jessop Steel Company	8,000
Jones & Laughlin Steel Corporation	1,314,000
Kaiser Company, Inc.	24,000
Kaiser-Frazer Parts Corporation	55,000
Mahoning Valley Steel Company	85,000
National Steel Corporation:	
Great Lakes Steel Corporation	1,275,000
Weirton Steel Company	(a)1,385,000
Total	2,660,000
Parkersburg Steel Company	36,000
Phoenix-Apollo Steel Company	132,000
Portsmouth Steel Corporation	100,000
Reeves Steel and Manufacturing Company	75,000
Republic Steel Corporation	1,530,000
Sharon Steel Corporation:	
Niles Rolling Mill Company	125,000
Simonds Saw and Steel Company	4,000
United States Steel Corporation:	
Carnegie-Illinois Steel Corporation	3,606,100
Columbia Steel Company	274,350
Tennessee Coal, Iron and Railroad Co.	268,000
Total	4,148,450
(a) Includes hot rolled strip.	
Universal-Cyclops Steel Corporation	13,100
Vanadium-Alloys Steel Company:	
Colonial Steel Company	1,120
Wheeling Steel Corporation	723,000
Youngstown Sheet and Tube Company	1,020,000
Grand Total	18,947,570

(CONTINUED ON PAGE 204)

STEEL STEEL STEEL STEEL

COMPLETE STOCK

11 to 26 ga. all sizes. We offer prompt delivery on all perforated designs: Grecian, Union Jack, Round, Square, etc. All designs also available in Monel, Brass, Aluminum, Stainless. Immediate response to all inquiries. Catalog on request.

ACCURATE PERFORATING CO., INC.

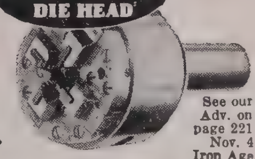
3157 W. Fillmore Street
Chicago 12, Ill.

Famous for

- ACCURACY OF THREADS
- LOW CHASER COST
- ALL AROUND DEPENDABILITY

Bulletins available: General Purpose Die Heads. Insert Chaser Die Head. Threading Machines.

H&G DIE HEAD



See our Adv. on page 221 Nov. 4 Iron Age

THE EASTERN MACHINE SCREW CORP., 21-41 Barclay St., New Haven, Conn.
Pacific Coast Representative: *A. C. Berhringer, 33¼ N. San Pedro Street, Los Angeles, California.* Canada: *P. F. Barber Machinery Co., Toronto, Canada.*

MICHIANA PRODUCTS CORP.

MICHIANA

See Display Ad in November 11th Issue

HEAT- and CORROSION-RESISTANT ALLOYS

MICHIGAN CITY, INDIANA

NICHOLSON *Fast-Acting* 2-WAY VALVES

Save Muscle

Turning on or off instantly with 60° lever travel, Nicholson valves are widely used as replacements for gate or globe valves. Save time; improve pressure control. Also a full line of 3 and 4-way cylinder control valves. CATALOG 546.

Lever model: sizes ¼" to 2½"; press. to 5000 lbs. Also foot, solenoid, motor types.

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THE STANDARD OF QUALITY P.S.A

Heat Treated
Steel Shot & Grit

PHILADELPHIA STEEL ABRASIVE CO.
MODENA, PA. Phone COATESVILLE 2534

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and
HAND and POWER BENDING BRAKES
and
DIES FOR ALL STANDARD MODERN PRESS BRAKES

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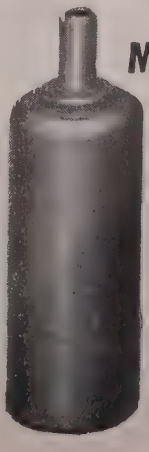
World's Largest Makers of Steel Press Brakes—Hand and Power Bending Brakes



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is important to the manufacturer who depends on parts for assembly. Quality stampings from steel, brass and aluminum—delivered on prompt schedule.

Send blueprints or samples for quotation.

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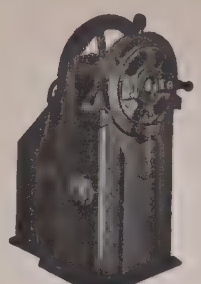
Established 1883
10 HUNT STREET • WORCESTER, MASS



THE TORRINGTON ROTARY SWAGING MACHINE
— with 4000 forceful squeezing hammer blows per minute—makes metal tougher and more elastic. Send for booklet—"The Torrington Swaging Machine."

The Torrington Co., Swager Dept.
56 Field Street Torrington, Conn.

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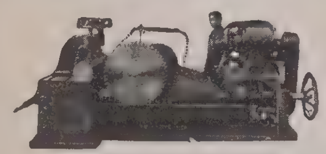
AUTOMATIC EQUIPMENT
The
V & O PRESS COMPANY
HUDSON, NEW YORK



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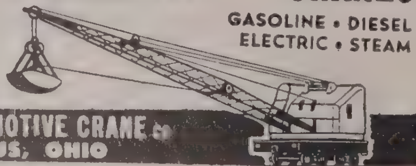
CAP SCREWS • SET SCREWS • COUPLING BOLTS
and MILLED STUDS in all sizes and threads



OHIO LOCOMOTIVE CRANES
25 TO 40 TON CAPACITY
GASOLINE • DIESEL
ELECTRIC • STEAM
THE OHIO LOCOMOTIVE CRANE CO
BUCYRUS, OHIO

HAYWARD BUCKETS
Use this Electric Motor Clam Shell for rehandling bulk materials in Industrial Plants.
THE HAYWARD CO., 40-50 Church St., N.Y.

(CONTINUED FROM PAGE 202)

Sheets (Cold Rolled, Galvanized, and Long Terne)

	Annual Capacity (N. T.)		
	Cold rolled sheets	Galvanized sheets	Long terne sheets
Companies:			
Allegheny Ludlum Steel Corporation	15,000	......	......
Armco Steel Corporation	994,000	381,000	70,000
Bethlehem Steel Corporation:			
Bethlehem Steel Company	716,000	180,000	......
Borg-Warner Corporation	......	90,000	20,000
Continental Steel Corporation	......	75,000	......
Crucible Steel Company of America	9,600	......	......
Eastern Stainless Steel Corporation	13,000	......	......
Empire Steel Company	......	......	14,400
Follansbee Steel Corporation	......	......	12,000
Ford Motor Company	360,000	......	......
Granite City Steel Company	200,000	60,000	......
Inland Steel Company	500,000	86,400	......
International Detrola Corporation	......	96,000	16,000
Jessop Steel Company	2,000	......	......
Jones & Laughlin Steel Corporation	670,000	......	......
Kaiser & Frazer Parts Corporation	......	55,000	......
National Steel Corporation:			
Great Lakes Steel Corporation	1,500.000	25,000	......
Weirton Steel Company	750,000	210,000	30,000
Total	2,250,000	235,000	30,000
Parkersburg Steel Company	......	25,000	......
Phoenix-Apollo Steel Company	......	56,000	......
Reeves Steel and Manufacturing Company	......	42,000	......
Republic Steel Corporation	970.000	355,000	......
Sharon Steel Corporation:			
Niles Rolling Mill Company	......	51,600	......
United States Steel Corporation:			
Carnegie-Illinois Steel Corporation	1,064,045	298,100	41,300
Columbia Steel Company	......	102,520	......
Tennessee Coal, Iron and Railroad Co.	......	213,000	......
Total	1,064,045	613,620	41,300
Washington Steel Corporation	49.200	......	......
Wheeling Steel Corporation	480,000	390,000	24,000
Youngstown Sheet and Tube Company	466,000	......	......
Grand Total	8,758.845	2.791,620	227.700

Rails

	Annual Capacity (N. T.)	
	60 lb or less per yard	Standard (over 60 lb per yard)
Companies:		
Bethlehem Steel Corporation:		
Bethlehem Steel Company	32,400	630.000
Colorado Fuel and Iron Corporation	9,600	475,000
Inland Steel Company	......	125,000
Sweet's Steel Company	30,000	....
United States Steel Corporation:		
Carnegie-Illinois Steel Corporation	132,200	986,600
National Tube Company	......	19,000
Tennessee Coal, Iron and Railroad Co.	3,600	470,000
Total	135,800	1,475,600
West Virginia Steel and Mfg. Co.	85.000	....
Grand Total	292,800	2.705.600

AISI Holds Regional Meeting

Birmingham

• • • **Approximately 150 members** of the American Iron & Steel Institute, employees of company members and specially invited faculty members of engineering colleges attended one of a series of regional technical meetings here recently.

The meeting made available to men of the steel industry and to those who teach metallurgical students a wide variety of timely technical problems which the technical committees of the institute are engaged in studying.

Seven addresses on current problems of interest to the technical men were presented at the 1-day meeting. A. V. Wiebel, vice-president, Tennessee Coal, Iron & Railroad Co., presided at the morning session. R. S. Lynch, president, Atlantic Steel Co., presided at the afternoon session.

FURNACE ENGINEERS, INC.
FURNACES
FOR THE
STEEL INDUSTRY

F.E.I.

1551 W. LIBERTY AVE. PITTSBURGH 26, PA.

STEEL from STOCK
BARS • STRUCTURALS • PLATES
SHEETS • COLD FINISHED • ETC.
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AMERICAN PETROMETAL CORP.
BROADWAY AT 11th ST., LONG ISLAND CITY 2, N. Y.

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JOSEPH P. CATTIE & BROS., INC.
Gaul & Letterly Sts., Philadelphia 25, Pa.
Philadelphia's Oldest, The Country's Largest
Hot Dip Job Galvanizer • Galvanized Products Furnished
Pickling and Oiling

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Fellows
MACHINES AND TOOLS FOR
GEAR PRODUCTION
The Fellows Gear Shaper Company, Springfield, Vt

WIRE AND METAL RIBBON
FORMING MACHINERY
NILSON TILTING
WIRE REELS
(Wire Reel Catalog No. 51)
Special Machines Designed and Built to Order
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making dies
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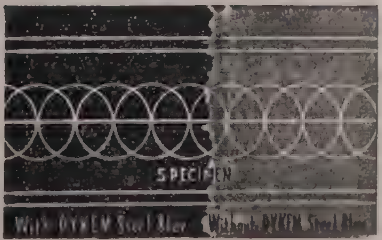

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THE DYKEM COMPANY, 2303G North 11th St., St. Louis 6, Mo.
In Canada: 2466 Dundas St. West, Toronto, Ont.

Specify H AND P

METAL STAMPINGS and STAMPING DIES
• Over 20 years of shop practice combined with designing and engineering skill enables us to create dependable dies for your intricate metal stampings. Let us produce your parts in large or small quantities.
• Send Us Your Blue Prints and Specifications.
THE H AND P DIE and STAMPING CO.
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PERFORATED
TO YOUR REQUIREMENTS
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PERFORATED METALS
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ALL SIZE AND SHAPE HOLES—ALL METALS
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BOX 28, Write for Catalog 35 WYOMING, PA.

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Worcester, Mass.
Drilling Machinery
Belt and Motor Spindle
One to Six Spindles
Tapping Attachments and Multiple Heads

GOSS and DE LEEUW
MULTIPLE SPINDLE
CHUCKING MACHINES
Four, Five, Six, Eight Spindles • Work and Tool Rotating Type
GOSS & DE LEEUW MACHINE CO., KENSINGTON, CONN.

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BOIARDI STEEL CORPORATION
300 Lower Market St. Milton, Pennsylvania

Screw Machine Parts to Order from
STEEL·BRASS·STAINLESS STEEL
Samuel J. Shimer & Sons
BOX 268 MILTON, PENNA.

Threaded Products Standardized

Washington

• • • **The signing of an** international accord recently by representatives of the United States, United Kingdom, and Canada now makes possible for the first time in history complete interchangeability of bolts, nuts, and other threaded products manufactured in the three nations.

While agreement on all fundamental points has been reached, there still are minor details to be worked out. It is expected that several years will be required to effect the changes completely in all three countries.

Details and specifications for the U. S. were drawn up by the National Bureau of Standards, working in cooperation with the Sectional Committee on the Standardization and Unification of Screw Threads. This committee was organized under the American Standards Assn. and was sponsored by the American Society of Mechanical Engineers and the Society of Automotive Engineers. Representatives of the Departments of the Army, Navy, Air Force and Commerce also represented the U. S. through the Interdepartmental Screw Thread Committee.

The new unification agreement provides a 60-degree angle and a rounded root for screw threads. The crest of the thread may be flat, as preferred in U. S. practice, or rounded, as preferred by the U. K. The number of threads per inch for the various series of thread diameters has been unified, and the limiting dimensions for three classes of fit have been agreed upon. The three classes of fit that have been recognized are loose, medium, and close.

LIMITS OF UNIFIED THREAD FORM

STANDARDIZATION PACT: *The standard thread size pact signed by Canada, Britain and the United States is expected to save each country millions of dollars annually. Pictured left to right during the signing at the National Bureau of Standards are T. R. B. Saunders, Britain's Minister of Supply; Dr. Edward U. Condon, director, National Bureau of Standards; William Batt, chairman of the sponsors council; and C. D. Howe, Canada's Minister of Trade and commerce.*

New NBS Standard Hydrocarbon Samples

Washington

• • • **The National Bureau** of Standards and the American Petroleum Institute, through a cooperative program begun in 1943, have prepared a total of 150 compounds now available as NBS standard samples of hydrocarbons for calibrating analytical instruments and apparatus in the research, development, and anaytical laboratories of the petroleum, rubber, chemical, and allied industries.

The most recent additions to the series of compounds have been announced by the Bureau as follows:

NBS Sample Number[1]	Compound	Amount of Impurity[2]	Volume Per Unit[3]	Price Per Unit
		mole percent	ml (liquid)	
535-5S	3-Methyl-trans-2-pentene.....	0.14±0.09	5	35.00
536-5S	4-Methyl-cis-2-pentene.......	0.25±0.07	5	35.00
558-5S	2, 3-Pentacliene.............	0.15±0.07[4]	5	35.00
559-5S	n-Dodecane..................	0.031±0.025	5	35.00
560-5S	1-Methyl-3-isopropylbenzene...	0.064±0.038	5	35.00
561-5S	trans-Decahydronaphthalene... (trans-Bicyclo-[4, 4, o]-decane)	0.04±0.03	5	35.00

[1] The designation 5S following the sample number indicates a sample of 5 ml sealed n vacuum in a special Pyrec glass ampoule with internal break-off tip.

[2] The purity has been evaluated from measurements of freezing points as described n J. Research Natl. Bur. Standards 35, 355 (1945) RP1676; unless otherwise indicated.

[3] Tolerance approximately ±10 percent.

[4] When sealed Polymer formed may be removed as residue by simple vaporization of the sample "in vacuum" at an appropriate temperature.

Resistance Welding in Aircraft

Detroit

• • • **There is one way** in which the production of military and naval aircraft may be tremendously speeded at reduced cost while at the same time increasing the structural strength, according to Prof. A. R. Hard of Washington State College.

The process would involve the scrapping of almost countless rivets, bolts and nuts, and assembling the parts by fusing them together through the use of resistance welding, a process in which the parts are merely pressed together and an electric current passed hrough them for a fraction of a second.

The process, according to Prof. Hard, produces a oint that is over 30 pct stronger than the riveted oints used mainly up to now in the production of military and naval aircraft.

That these findings are not based on isolated test esults was brought out by C. E. Smith, Chief Engineer of the Taylor-Winfield Corp. who showed examples of hundreds of such welds made one after another without any adjustment of the welding equipment.

A representative of the Resistance Welder Manuacturers Assn. confirmed that only a small percentage of resistance welding has been used up to now in military aircraft, although the percentage is slightly higher in recently designed commercial planes.

General adoption of the process for aircraft producion, it was admitted, would mean a virtual revolution n manufacturing methods for military and naval airraft, particularly in view of the tremendously higher ssembly speeds possible.

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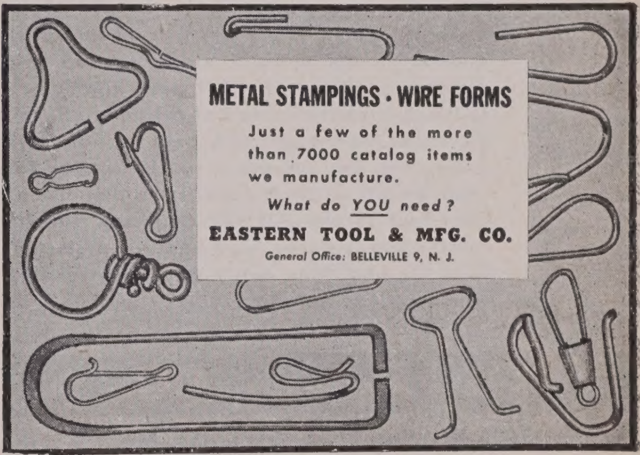
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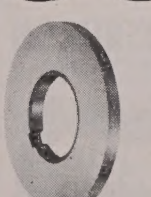
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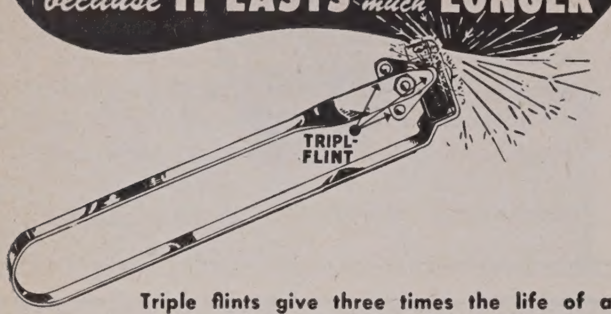
the Meco TRIPL-FLINT LIGHTER COSTS LESS because IT LASTS so much LONGER



Triple flints give three times the life of an ordinary lighter. When one flint wears down, another is quickly and easily rotated into place. In addition every flint wears right down to the metal base instead of breaking off. The big round file not only assures a fat, hot spark every time, but because it can be rotated for wear on all sizes, it outwears a flat file at least four to one — is self cleansing. Handle construction is sturdy, rigid and rust protected. Both file and flints easily and inexpensively replaced. Inquire today!

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QUALITY GEARS FOR OVER 30 YEARS

Production Problems Listed by AMA

New York

• • • **The American** Management Assn. announce today a survey of 1,000 companies throughout th United States showed the eight most pressing problems currently confronting production executives i their attempt to lower costs and increase output an quality are:

(1) Insufficient employee interest in increase production.

(2) Inability to meet customer deliveries be cause of uncertainty of deliveries from supplier

(3) Maintenance inefficiency causing time los for repairs.

(4) Less than maximum effectiveness in physical handling of materials in the manufacturin process.

(5) Inadequate leadership by foremen an supervisors.

(6) Lack of sufficiently close coordination be tween production engineering and sales.

(7) Inadequate inventory controls in schedulin full use of equipment for plants producing a wid variety of products.

(8) Interruptions of production where desig changes rapidly.

Reynolds Enters Architectural Field

Louisville

• • • **Reynolds has entered** the architectural fiel with a complete line of standard shapes in extrude aluminum, according to David P. Reynolds, vice-president, General Sales Division, Reynolds Metals, Co Louisville.

In making the announcement, he said that "standar architectural shapes now available include thresholds window sills, jambs, molding and stools; handrail with balusters and finishing shapes; base moldings copings; facia and gravel stops. Orders for these item are now being scheduled for early delivery."

In addition, Mr. Reynolds revealed that after Ja 1, 1949, these items will be stocked by a nationwid distributor organization with warehouses in approximately 50 of the largest cities in the United State These items will thus be available for immediate shipment from stock. Too, the line is to be extended t cover many other items such as door jambs and related shapes.

Gets Steel Contract for UN Building

New York

• • • **A contract for** the furnishing and the erectio of the steel of the 40-story Secretariat building of th United Nations to be erected at the East River in Ne York City, between 42nd and 48th Sts., was awarde to the American Bridge Co., U. S. Steel Corp. subsidiary, it was announced recently by F. K. McDane president of American Bridge.

This will be the first structure in the permanen home of the United Nations to be built on the Ne York City site. About 13,000 tons of steel will be required for the towering Secretariat structure, whic will be 72 ft wide and 287 ft long. The building wi comprise 39 floors and a penthouse.

Measures Thickness of Coatings

Washington

• • • **A convenient,** nondestructive magnetic method for determining the thickness of composite copper-nickel coatings electrodeposited on steel has been developed by Abner Brenner and Eugenia Kellogg of the National Bureau of Standards.

The method involves the measurement of the attractive force between the plated specimen and two permanent magnets of different strengths. The values thus obtained are used, in conjunction with a set of previously determined calibration curves for each magnet, to obtain the total thickness of the coating and the relative thicknesses of the copper and nickel layers.

Composite coatings, in which nickel is deposited over a layer of copper, are used extensively in the automotive and other industries for the economical protection of steel against corrosion.

While the effectiveness of these coatings is usually somewhat inferior to that of pure nickel plate, the copper required is less expensive than the extra layer of nickel that would otherwise be necessary. As the protective value of the composite coatings depends largely on their thickness, it is important to have a convenient means for measuring this property.

In the usual procedure, the plated article must be destroyed to provide a cross section for microscopic examination. The new magnetic method, on the other hand, eliminates the necessity of cutting the specimen and is easily and rapidly applied.

Cladmetal Utilized in Cooking Utensils

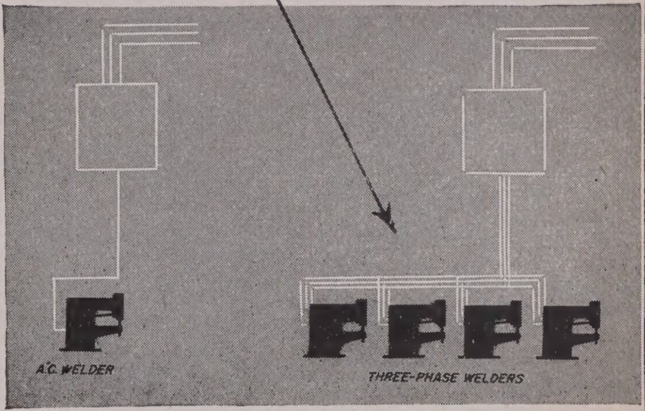
New York

• • • **Production of** a new line of restaurant cooking utensils made of the new Rosslyn Metal, copper core with stainless steel surfaces, is now under way at the Lalance & Grosjean Mfg. Co., according to A. J. Cordier, president of the Woodhaven, N. Y., firm which has produced restaurant utensils since 1850.

The copper core is an integral part of the new material and runs all through the sides and bottom of the new utensils. The copper spreads the heat quickly and evenly through the vessels in all directions. The inner and outer surfaces of stainless steel provide a hard, bright metal cover that resists corrosion and is easily cleaned. Stainless steel and copper are bonded together permanently to make Rosslyn Metal, a product of the American Cladmetals Co., Carnegie, Pa.

The new cladmetal combines the qualities of the two most desirable metals in a cooking utensil. Copper has long been preferred by old world chefs due to its uniform distribution of heat to make for distinctive cooking. Stainless steel, however, is more durable and far easier to clean, important factors in modern kitchens. No matter where heat is applied to the outer stainless steel surface of the Rosslyn Metal, once the heat hits the copper intercore it carries immediately to the entire area of the utensil and evenly heats the innermost stainless steel layer which contacts the food.

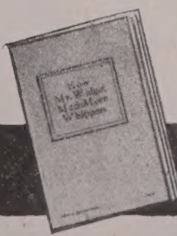
want to get **4 times as much welder capacity** on your same power distribution facilities?



Mighty "Three-Phase" is pointing out to Mr. Widget how he can install four times more resistance welding load without adding to his plant power distribution facilities. It's simple . . . all he does is install the revolutionary Sciaky "THREE-PHASE" welders! "THREE-PHASE" is an achievement in power efficiency that compensates for the high intermittent loads encountered with most resistance welding jobs. It actually allows him to do the same welding job with only ¼ *the current* required by an ordinary A.C. welder!

Further, he gets a *balanced load* on all three phases of his supply. And his power supplier is happy because the machines operate on better than *80% power factor.* He's happy because he can get Sciaky "THREE-PHASE" welders in big and little sizes—in spot, seam or projection models.

How Mr. Widget became a "Man of Success" is lucidly told in this little booklet. A copy is yours for the asking—just fill in and mail the coupon below



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AIR COMPRESSOR
210 cu ft Schramm Model 210 4½″x4¾″ 6-Cylinder, V-Belt Pulley Drive including 50 HP AC Motor, 100# Press.
150 cu. ft. Worthington 2-Stage V-Belt Drive With 3 H.P. G.E. Motor 125# Pressure
315 cu. ft. Model RXI Portable Air Compressor With 125 H.P. Gasoline Engine
1300 cu. ft. Ingersoll-Rand 2-Stage, Motor Dr. With 312 H.P. G.E. Synchronous Motor

ANGLE BENDING ROLLS
4x4x½″ BERTSCH Angle Bending Roll, M.D.
3x3x⅜″ BUFFALO Angle Bending Roll, M.D.
2x2x¼″ BUFFALO Angle Bending Roll, M.D.

BENDING ROLLS
10′ Kling Pyramid Type Bending Roll, Motor Dr. Capacity ½″ Mild Steel
12′ Hilles & Jones Pyramid Type Bending Roll, Capacity 12″ x ⅜″ or 10′ x ½″ Belt Driven
14′ Bertsch Initial Type Bending Roll, Rolls 9½″ Diameter, Belt Driven

BRAKE—PRESS TYPE
10′ x 3/16″ Chicago Press Brake, Arr. M.D.

CRANES—GANTRY
10 ton Milwaukee 33′ Span 440/3/60 AC
15 ton Harnischfeger 27′ Span 230 Volt DC

CRANES—OVERHEAD ELECTRIC TRAVELING

2 ton Shepard-Niles	28′ Span 550/3/60 AC.
2 ton Shepard-Niles	36′ Span 550/3/60 AC.
3 ton Shepard-Niles	28′ Span 550/3/60 AC.
3 ton P & H	37′6″ Span 440/3/60 AC.
5 ton Shepard-Niles	27′3″ Span 230 Volt DC.
5 ton Wright	31′ Span 440/3/60 AC.
5 ton Shepard-Niles	40′ Span 230 Volt DC.
5 ton Wright	47′ Span 440/3/60 AC.
5 ton Northern	60′ Span 220/440 AC.
6 ton P & H	60′ Span 230 Volt DC.
10 ton Wright	22′4″ Span 440 Volt AC.
10 ton Morgan	47′8″ Span 230 Volt DC.
10 ton Morgan	52′ Span 230 Volt DC.
20 ton P & H	50′ Span 220/3/60 AC.

200 ton ALLIANCE Overhead Electric
Traveling Crane 100′ Span
25 ton Auxiliary Hoist
Five 230 Volt DC Motors

DIEING MACHINES
85 ton Henry & Wright Dieing Machine Double Roll Feed, Scrap Cutter 2″ Stroke
60 ton Henry & Wright Dieing Machine, Double Roll Feed, Scrap Cutter, 5″ Stroke
75 ton Henry & Wright Dieing Machine Double Roll Feed, 6″ Stroke, Motor Driven

DRAW BENCHES
50,000# Aetna Standard Single Chain Draw Bench 50′ Draw. Complete with hydraulic system and electrical equipment
50,000# Aetna Standard Double Chain Draw Bench 30′ Draw. Both Complete with Elecl. Equipment

FORGING MACHINES
1¼″ Pawtucket Bolt Forging Machine
3″, 3½″, 4″ Ajax
3″, 4″, 5″, 6″, 7½″ National
4″ Acme Model XN

FURNACES
1½ Ton Moore Type "Q" Lectromelt Furnace Complete with Transformer Equipment
2 Ton Heroult Nose Tilt Type Melting Furnace
3 Ton Heroult Rocker Tilt Type Melting Furnace
6 ton Moore Type OT Lectromelt Furnace
Lee Wilson Rotary Hearth Heat Treating Furnace Oil Fired for forging, forming, heat treating, etc. Rotary 11′ Dia.
500# Electric Furnace Co. Tilting Type Rotary Gas Furnace. Complete with Accessories

GEAR HOBBING MACHINES
No. 5B Sykes Gear Generator, Motor Driven. Will cut a gear from 3″ to 61″ dia. by 48″ wide on spur and 21″ on Herringbone. New 1945
No. 120-H Gould & Eberhardt Universal Gear Hobbing Machine, Capacity Spur Gears up to 144″ Dia., Helical Gears up to 120″ Dia. Complete with Electrical Equipment

GEAR REDUCERS
600 H.P. Westinghouse Reduction Unit Ratio 3:76-1
500 H.P. Mesta Double Reduction Ratio 11:1
600 H.P. Falk Single Herringbone Gear Reducer. 366/40 RPM
1000 H.P. Falk Double Reduction Ratio 29:1

HAMMERS—BOARD DROP
1000# Billings & Spencer Model D
2000#, 4000# Chambersburg Model F
2500# Erie

HAMMERS—STEAM DROP
1000 lb. Chambersburg and Erie
1500# Erie
2000# Erie

HAMMERS—STEAM FORGING
800# Lane Single Frame
1000, 1250, 1500, 1600, 4000# Chambersburg
800, 900, 1000, 1250, 2500, 4500# Niles-Bement-Pond
1100, 1500, 1600# Erie Single Frame
20,000# Arch Type, 8000# Morgan

HAMMERS—MISCELLANEOUS
1000# Chambersburg Pneumatic Motor Driven Forging Hammer, Complete with Motor
48″ x 48″ Chambersburg CecoStamp Hammer
48″ x 36″ Chambersburg CecoStamp Hammer
30″ x 24″ Chambersburg CecoStamp Hammer

LEVELER—ROLLER
48″ Roller Leveler, Motor Driven, 17 Rolls 5¼″ Dia.
48″ Roller Leveler 17 Rolls 1⅝″ Diameter

LOCOMOTIVE—GASOLINE
35 ton Plymouth Model ML-8 Type 0-4-0 Gasoline Locomotive, Standard Gauge New 1943

MILLING MACHINES—PLANER TYPE
Ingersoll Slab Milling Machine, 26″ wide x 30″ height between housings, Table 30″ x 20′
Ingersoll Slab Milling Machine, 42″ wide x 30″ height between housings, Table 48″ x 20′

NIBBLER
No. 10-B Gray Turret Head Metal Nibbler Motor Driven, 36″ Throat. Capacity mild steel 9/16″. Complete with Circle Cutting Attachment

PLANERS
36″x36″x8′ Cincinnati Hypro Planer, Motor Dr.
36″x30″x10′ Cincinnati Planer, Motor Driven
32″x35″x10′ Niles Tool Works Planer, Motor Dr.

PLANER—OPEN SIDE
36″x36″x8′ Detrick & Harvey, Belt Driven

POLISHING MACHINE
No. 101 Production Machine Co. Polishing Machines (3 in tandem). Complete with Centerless Belt Feed & Wheel Truing Unit. Complete with Elec. Equip. & Accessories

PRESSES—HYDRAULIC
150 ton HPM Hydraulic Press, 48″ Stroke 30″ x 30″ Platen
300 ton HPM Hydraulic Press, Complete with Pump & Motor, Bed Area 30″ x 36″, Stroke 18″, Daylight 24″
375 Ton Elmes 4-Column Drawn Press, Complete with Motors and Controls, 66″ x 84″ Bed Area, 36″ Total Ram Stroke
600 ton Hydraulic Extrusion Press, 35½″ Stroke, 29″ x 26″ Platen Size
700 Ton Robertson Hydraulic Extrusion Press, Complete with Pump & Motor
750 ton Lake Erie Double Acting Hydraulic Press, Platen 146″ x 81½″, Stroke 46″
1000 ton Chambersburg 4-Column, Hydraulic Press, 18″ Stroke, 48″ x 22″ Between Columns
2000 ton Wood Hydraulic Press, 9″ Stroke, 24″ x 35″ Bed Area
4000 ton Steam Hydraulic Forging Press, 128″ x 64″ Between Columns, Single Stroke 7″, Total Stroke 80″, Complete with Accessories

PRESS—HYDRAULIC WHEEL
400 ton Chambersburg Hydraulic Wheel Press, Motor Drive

STRAIGHTENERS AND BAR TURNING MACHINES
No. 1 Medart Straightener, MD. Capacity ½″ to 2½″ rounds
Type "A" Medart-Brightman Bar Turning Machine, MD. Capacity 1″ to 4″ diameter
Type "B" Medart-Brightman Bar Turning Machine MD. Capacity 3″ to 6″ diameter
⅜″ Shuster Straightening & Cut-Off Machine Motor Driven. With 16′ Cut-Off
⅝″ Wells Straightening & Cut-Off Machine Motor Driven. With 20′ Cut-Off
⅝″ Wells Roller Type Straightening & Cut-Off Machine, Arr. M.D. With 22′ Cut-Off
No. 1½B Sutton Engr. Co. Round Straightener
No. 5 Kane & Roach Straightener, Belt Drive, Capacity Angles 4x4x½″, Rounds & Squares 2½″, Flats 3½″ x 1″

PRESS—KNUCKLE JOINT
No. K-1200-30 Clearing Knuckle Joint Press 200 Ton Capacity 4″ Stroke, 31″ Between Uprights
No. 24K Bliss Knuckle Joint Press 400 Ton, 4″ Stroke, 20 x 20″ Bed Area

PRESSES—STRAIGHT SIDE
#87 Bliss Reducing Press, V-Belt Motor Drive 16″ Stroke, 26″ Between Uprights
300 ton Bliss Press Single Crank Double Geared 10″ Stroke, 40¼″ x 33½″ Bed Area
#306½ Bliss Press, Motor Driven, 7″ Stroke, Bed Area 27″ x 27
#305 Bliss Press, Motor Driven 12″ Stroke, Bed Area 24″ x 24″
Ferracute Straight Side Punch Press, 100 Ton, 3″ Stroke, 45 x 36″ Bed Area
M & S Straight Side Punch Press, 37 Ton, 5½″ Stroke, 15 x 15″ Bed Area

PRESS—TOGGLE DRAWING
No. 185 Toledo 1400 ton Single Crank Press, 26″ Stroke of Plunger, 18″ Stroke of Blank-holder, Bed Area 72″ x 72″

PUMP—VERTICAL TRIPLEX
2⅜″ x 8″ Aldrich Vertical Triplex Pump, Capacity 37 GPM at 1500 lbs. Pressure

PUNCH—BEAM
Size B Long & Allstatter Beam Punch & Coping Machine. Capacity to punch 2 or more holes in flanges or 6 or 8 holes in web of 24″ and smaller beams, and cope sections of same size and smaller beams, channels, etc.

PUNCH—HORIZONTAL
No. 1 Hilles & Jones Horizontal Punch, Capacity ⅞″ thru ¾″

PUNCH & SHEAR COMBINATIONS
Style G Cleveland Punch & Shear Double End 48″ Throat, Capacity Punch 2″ Thru 1″
Style G Cleveland & Punch & Shear Single End 60″ Throat, Capacity Punch 2″ thru 1″ plate
Style EF Cleveland Double End Bar & Angle Shear Motor Driven, Completely Equipped, NEW 1947
Style EF Cleveland single end arranged or geared Motor Drive. 72″ Throat Capacity Punch 1¼″ thru 1″
No. 48 Buffalo Armor Plate Single End Punch & Shear, Direct Motor Drive. Capacity Punch 1⅜″ x 1″, Shear 2″ Rd. 1¾″ Sq.
No. 2 Long & Allstatter Double End Throats 60″ and 42″, Capacity Punch 1″ thru 1″

PUNCH—MULTIPLE
Size G Long Allstatter Multiple Punch, Motor Driven 8′6″ Between Housings, Complete with Spacing Table Automatic Spacing Indicator & Automatic Table Adjustment

RIVETERS
Chambersburg Engr. Co. Hydraulic Riveter 10′6″, Standard Riveting Attachments
125 ton Hanna Bull Riveter, 75″ Reach, 24″ Gap, Capacity 1″ Rivet Cold & 1½″ Hot

ROLLING MILLS
3 x 5½″ Ruesch Three High Mill
4 x 7″ Standard Single Stand Two High
8 x 4½″ McWilliams Single Stand Two High
10 x 12″ Cold Rolling Mill 3 Stand 2 High
12x24″ Waterbury Farrel Single Stand Two High
16½ x 30 Mesta Single Stand Two High
18″ x 30″ Farrel Two Stand Two High
20″ x 30 Mesta Four Stand Two High
20 x 40″ Mackintosh Cold Reduction Mill
20x42″ Waterbury Farrel Single Stand Two High
20 x 60″ Three Stand Two High
24″ x 60″ Two Stand Two High
9″ Two High Hot Mill for rolling strip steel

ROLLS—PLATE STRAIGHTENING
98″ Hilles & Jones Plate Straightening Roll 6 Rolls 11″ Dia. Capacity 1″ Plate
No. 4 Hilles & Jones Plate Straightening Roll, Motor Driven, 6 Roll 14″ Dia. x 10′4″ Wide, Capacity 1″ Mild Steel
No. 2B Kane & Roach Straightener, Motor Drive 13 Rolls 8½″ Diameter

ROLLS—TAPER FORGING
#1 Ajax Taper Forging Roll, Motor Drive
#5 Ajax Taper Forging Roll, Motor Drive

SAWS
Z-36 Do-All Zephyr Saw, Motor Driven—36″ Throat 36″ Work Table—New 1947
42″ Newton Type U-82-A Heavy Duty High Speed Cold Saw, Completely Hydraulic, Elecl. Equipment Included. Capacity 16″ Round or Square with 48″ Blade
AVEY Band Saw, Motor Driven Capacity 6″ Round or Square

SHEARS—ALLIGATOR
No. 1½ Doelger & Kirsten Alligator Shear Motor Driven. Capacity 2″ Round
No. 2 Doelger & Kirsten Alligator Shear Motor Driven. Capacity 3″ Round
No. 3 Doelger & Kirsten Alligator Shear, Motor Driven. Capacity 4″ Round, 3½″ Square

SHEARS—ANGLE
No. 3 Hilles & Jones Double Angle Shear, Capacity 6 x 6 x 1″, Motor Driven
No. 5 Hilles & Jones Double Angle Shear, Capacity 8 x 8 x 1¼″, Motor Driven

SHEAR—BAR
No. 1 Long & Allstatter Bar Shear, Motor Driven, Capacity 2″ Round, 1¾″ Square

SHEAR—BILLET
No. 6 Mesta Billet Shear, Motor Driven, Capacity 6″ x 6″ Square Billets

SHEARS—GATE
8′ x 1″ Cincinnati Gate Shear, Motor Dr.
9′ x ¾″ Bertsch Gate Shear, Arr. M.D.
120″ Morgan Gate Shear, Motor Driven, Hydraulic Holddowns, Complete with pump and motor. Capacity 1½″ Mild Steel

SHEARS—ROTARY
No. 50 Quickwork Rotary Shear, Motor Drive, Capacity ¾″ Mild Steel
No. 250 Kling Rotary Shear, Arr. Motor Drive, 36″ Throat Capacity ¼″ Plate
No. 500 Kling Rotary Shear, Motor Driven, Capacity ½″, Complete with circle cutting, flanging and joggling attachments

SHEARS—SQUARING
13′ x ⅜″ Dreis & Krump All Steel
10′ x ⅛″ Niagara Overdriven Shear

SLITTERS
Yoder GH-36 Gang Slitter & Leveling Machine, Capacity 4 cuts ¾″ to 13 cuts 3/16″, 8 Levelin Rolls 44″ x 5″ Dia. Motor Drive.
30″ Torrington Slitter, Arr. Motor Drive. Capacity 4 cuts .400″ Gauge 30″ wide
#621 Torrington 48″ Slitter, Arr. Motor Drive with Slip Clutch Recoiler

STRAIGHTENERS
No. 4 Medart Straightening Machine, Arranged fo Motor Drive. Capacity 2½″ to 6″ Incl. Round Bar
No. 4 Sutton Straightening Machine, Motor Drive, Capacity 2″ to 6″ Round. Timken equipped
Kane & Roach Rotary Straightener, Capacity ½″ O.D. and smaller

SWAGING MACHINES
#112 Etna Machine Co. Rotary Swager, Arr. M.D.—Capacity Tubing 4″, Die Length 18″—New 194
No. 8IIS Langeller Swaging Machine, M.D., Capacity 6½″ Tubes, 4½″ Solids, Hot
Waterbury Farrel Triple Die Swaging Machine, Capacity Tubes ½″ to 4″, Motor Driven

TESTING MACHINES
60,000# Biehle Universal Hydraulic
200,000# Baldwin-Southwart-Tate Emery Universa Hydraulic Testing Machine, Motor Drive
200,000# Elmes Compression Testing Machine, Hydraulic Type
800,000# Hydraulic Chain Testing Machine

TUBE BENDING MACHINE
No. R-48 Williams & White Hydraulic Tube Bendin Machine, Motor Driven. Capacity 1¼″ dia. 1 gauge with 3 H.P. Motor or 2″ dia. 16 gauge with 5 H.P. Motor. New 1947

• Manufacturing **RITTERBUSH & COMPANY, INC.** Equipment •
50 CHURCH ST., NEW YORK CITY, 7
Telephone Cortlandt 7-3437-3438

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